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A QUARRY WORKSHOP OF THE FLAKED-STONE IMPLEMENT MAKERS IN THE DISTRICT OF COLUMBIA.*

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In this paper I desire to present a brief account of recent archæological investigations in the suburbs of the city of Washington. The work is yet incomplete, but as winter has put an end to operations in the field it is deemed best that the results thus far obtained should be brought to the attention of archæologists.

Heretofore I have taken little part in the discussion of questions pertaining to local archæology, as the evidence presented did not seem to be conclusive in any direction. The present exploration has been undertaken, therefore, without preconceived notions of what the results should be, and the conclusions are based almost entirely upon facts and arguments pertaining to and derived from my own investigation. Some conclusions of importance have been definitely reached and numerous questions have been answered. Some of the results were unexpected and some may at first seem a little startling, but I am happy to say that every tendency has been toward the simplification of what was in many respects a most perplexing problem.

THE RELICS.

From time to time during the past decade the attention of archæologists has been called to a class of rudely worked stones found in great numbers in the vicinity of this city. They are all shaped exclusively by chipping, and are of forms usually classed as palæolithic, the best-known variety being the so-called "turtle-back;" but other forms of less striking character, although more highly elaborated and interesting, are almost equally numerous.

* Read before the Society Nov. 16, 1889.

So numerous, indeed, are these objects in certain localities that they are brought in with every load of gravel from the creek beds, and the laborer who sits by the way-side breaking bowlders for our streets each year passes them by thousands beneath his hammer; and it is literally true that this city, the capital of a civilized nation, is paved with the art remains of a race who occupied its site in the shadowy past, and whose identity until now has been wholly a matter of conjecture.

PREVIOUS STUDY.

The first discussion of these objects within my memory occurred at a meeting of the Anthropological Society of Washington in the winter of 1878. A paper upon the turtle-backs was read by Dr. W. J. Hoffman, in which their character, manner of occurrence, age, and relations to the Abbott finds of New Jersey were discussed. Later Mr. S. V. Proudfit engaged in the collection and study of these forms, and in 1888 published a short paper relating thereto in the journal of this society. On his return from a long sojourn in Europe in 1887 Mr. Thomas Wilson took the subject up afresh, and has since published short papers upon the general subject of palæolithic man in America, in which allusion is made to the local finds. The most direct and thorough treatment of the subject occurred at a meeting of the Anthropological Society held in the month of April, 1889. In the symposial discussion of the archæology of the District of Columbia, three papers, by W J McGee, Thomas Wilson, and S. V. Proudfit, respectively, bore directly upon these rude objects; but up to the present time no one has essayed more than to study the surface finds, and therefore comparatively little was known of the true character and history of the chipped implements of the region.

SURFACE DISTRIBUTION OF RELICS.

The objects in question are somewhat sparingly scattered over the surface of the country, and are found to some extent upon ancient village sites along the Potomac and its tributaries; but the main deposits, as shown by recent discoveries, occur along the steep faces of the great terraces that surround the city. To these spots the ancient inhabitants resorted to collect the cobble-stones there outcropping and to chip them into desired shapes, and it is to these sites—the ancient workshops—that we must look for light to illumine some of the obscure features of archæologic science.

BEGINNING OF THE WORK.

In July, 1889, at the instance of the Director of the Geological Survey, I resigned my place in that organization to accept a place as archæologist, under the same direction, in the Bureau of Ethnology. It was intended that in the near future I should begin archæological investigations along the Atlantic coast, and I resolved to commence work at home—literally at home—for the nearest site in which these rude implements are found, and one of the most promising sites for archæologic research in the United States, was only one and a quarter miles from my own doorstep in this city.

But, aside from the convenience of the locality, there were other good reasons for beginning the work here. The relics found have a direct bearing upon questions of the early occupation of this country—an occupation believed by many to have preceded that of the Indian. These questions are of the utmost importance and demand the fullest and closest attention, since their study necessarily precedes and introduces the discussion of the general archæology of the Atlantic slope; but, further, these deposits of artificial refuse being of great extent and of unknown depth, the undertaking, to be carried out systematically and thoroughly, involved very considerable expense and seemed beyond the reach of private means.

The site chosen is representative of a class, and will serve in a measure as a key to all. Other localities may present different phenomena and possibly conflicting testimony, and their examination may lead to changes in some of the conclusions drawn from the study of this example; but the lessons here taught are for the most part complete in themselves, and the work as a whole will constitute a nucleus of well-ascertained fact, about which other units of like character will gradually accumulate. The work derives its chief importance from the fact that it is the first exploration in this section of a well-identified quarry workshop of the ancient flaked-stone toolmakers.

LOCALITY.

In passing out of the city by way of Fourteenth street extended, a picturesquely located bridge is crossed at a point one and a third miles from Boundary street. The little stream spanned by this bridge is known as Piny Branch and falls into Rock creek at a little more than half a mile below the bridge.

Arrived at the bridge, we are already within the limits of the im-

plement-bearing area, and the rude objects may be picked up on all sides—in the lanes that lead up through the forest-skirted farm of Mr. Blagden, in the beds of all the streams, and upon all the slopes north and south of the creek, including an area three-fourths of a mile square.

In this investigation we are particularly concerned in a portion of the area on the north side of the creek and just west of the Fourteenth-street road. Here the faces of the plateau rise to 100 feet above the creek bed and 200 feet above tide-water. The slopes are precipitous, but generally even and regular, and are covered with forest, much of which is primeval. A number of small rivulets descend from the plateau through deep ravines into the creek. One of these, coming down from the north, is seen by the road-side at the left, and another, quite obscured from any ordinary point of view by the forest, occurs one-fourth of a mile to the west. Between these two ravines is a promontory or spur of the plateau with a nearly level top 100 yards in width, the steep slopes of which descend to the rivulets on the east and west and to the creek on the south.

Upon these steep slopes the primitive peoples found the material used in implement making, and here they worked, until a mass of refuse of astonishing magnitude had accumulated. This is now found not only upon the slopes, but in the masses of gravel at the base of the slopes and in the flood planes of the valley, even down to Rock creek and for an unknown distance along its course.

DISCOVERY OF SHOP SITES.

Mr. S. V. Proudfit has in past years explored this locality with considerable care, and in the ANTHROPOLOGIST of July, 1889, he describes the distribution and character of the relics with accuracy and in some detail.

So far as known, the first discovery of worked stones upon the site of my excavations was made by Mr. De Lancey Gill, who was engaged in sketching upon the bank of the Branch, and by chance observed an implement in the gravel at his feet. Subsequently he came upon a number of heaps of shop refuse in the western ravine at the point now cut by my section.

In September, 1889, I visited Mr. Blagden, owner of the property, to obtain permission to work upon the premises, and learned from him that about the year 1878 a street contractor had been

permitted to collect material for paving from these grounds, and that the piles of refuse found by us were gathered together at that time, a portion only of the heaps collected having been carted away. At that time a narrow roadway was cut leading from the creek up the little ravine to the site of our recent labors. Mr. Blagden subsequently informed me that when yet a boy, some twenty-five years ago, he had observed the great quantities of bowlders at this point, and, desiring to know something of the reasons for their accumulation, had secured help to dig a trench, which was abandoned, however, before the bed of bowlder refuse was penetrated. I have no doubt that the evidences of former excavation discovered at the fiftieth foot of my section, and which caused me no little perplexity at the time, is thus fully explained.

SURFACE INDICATIONS OF QUARRY SITES.

In beginning the examination of this site my first step was to observe carefully its topographic features, with especial reference to such eccentricities of contour as might be due to the agency of man.

Extensive working over of débris, especially if associated with quarrying, would leave inequalities of surface which, if not afterwards obliterated or greatly reduced by natural forces, would be easily recognized as artificial. Such inequalities were readily found, and so well defined are they that even the casual observer could not fail to detect them. It was partly on account of peculiarities of profile that excavations were undertaken at the spot selected, and the results have shown that these surface indications were not deceptive.

The higher up the gulch we go the more pronounced are the elevations and depressions resulting from the ancient work. Either the disturbances here are more recent than below or the leveling agencies of nature have been less active.

THE EXCAVATION.

I shall not attempt in this place to give a detailed account of the geologic formations of the region, nor shall I refer to the methods of exploration and the interesting but tedious details of excavation. A brief review of those members of the geologic section most intimately associated with the work of man will be sufficient for present purposes, and the diagram here presented, Plate I, will assist in making all my statements clear. The three formations involved are,

first, the mica schists, A, which underlie the whole region and form the bed-rock of the Piny Branch bluff up to within perhaps forty feet of the summit. Second, the sedimentary gravels, sands, clays, and bowlder beds, B, lying horizontally upon the schists and forming the bed-rock of the upper forty feet of the slopes. These belong to the Potomac formation of Mr. McGee and are of Mesozoic age. Third, the over-placed cloak of soil and gravel, C, derived from the above fundamental formations and completely covering them. It is with these latter beds that the student of human history is chiefly concerned. At the point cut by the section these gravels are separable into three important but not always clearly definable groups, which may be designated as follows: 1st, the pre-artificial, C^1; 2d, the artificial and inter-artificial, C^2; 3d, the post-artificial, C^3.

The pre-artificial gravels, C^1, consist of detritus derived from the outcropping edges of the underlying formations and spread over the surface before this site was occupied. These are therefore free from artificial remains.

The artificial deposits, C^2, consist of beds and masses of débris obtained from surface gravels and from the Potomac beds beneath by men quarrying for bowlders, the raw material used in the manufacture of stone implements. These masses of refuse, worked over and rearranged by the hand of man, alternate in a rude way with layers of material that appear to have been redistributed to a certain extent by natural forces during intervals separating seasons or periods of human activity.

The post-artificial deposits, C^3, consist of surface detritus rearranged by natural forces anterior to the period of human occupation, and consist of gravel, loam, shop refuse, and vegetable mold. They form but a thin sheet, save in the flood plain of the rivulet, where they have accumulated in places to eight or ten feet in thickness. They contain numerous relics from the workshops throughout the large area examined, and upon the middle part of the slope cut by my section the relics and shop refuse are amazingly prevalent, forming, perhaps, one-fourth of the entire mass.

Now at the point cut by this section small portions only of the pre-artificial-slope gravels remain in their normal condition. The principal parts remaining are near the lower and upper ends of the cutting, where the ancient workman left them undisturbed. Other small portions probably remain upon the uneven edges of the schists

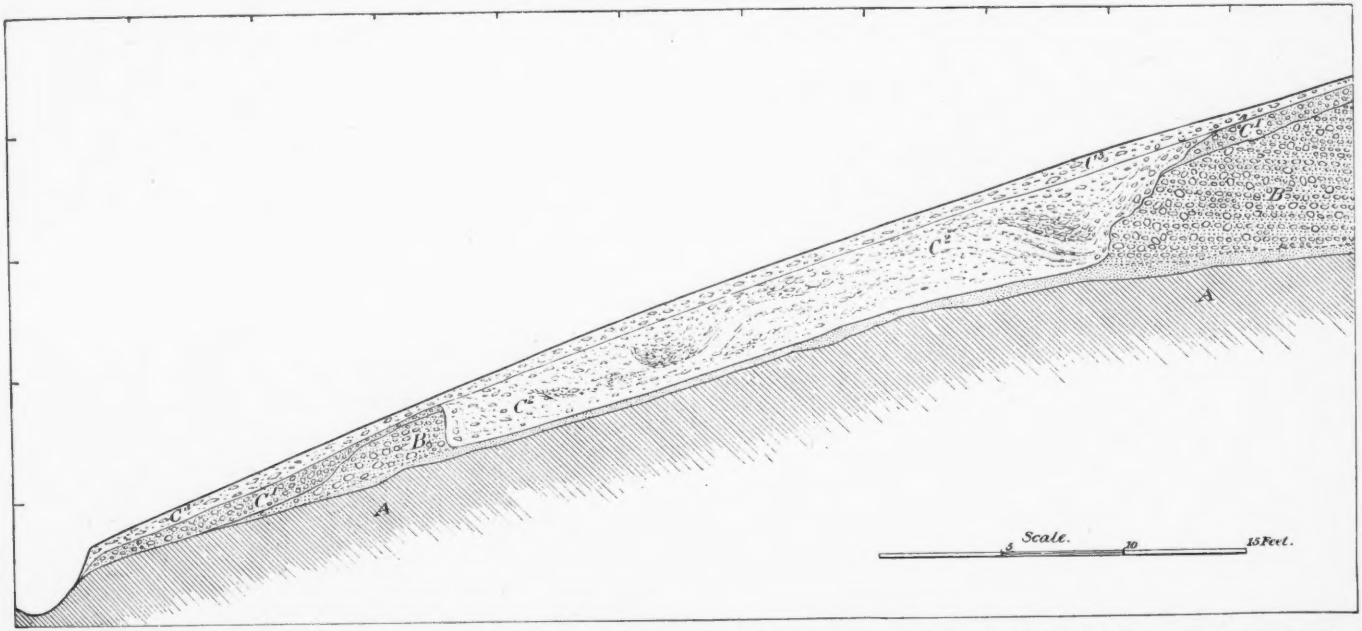
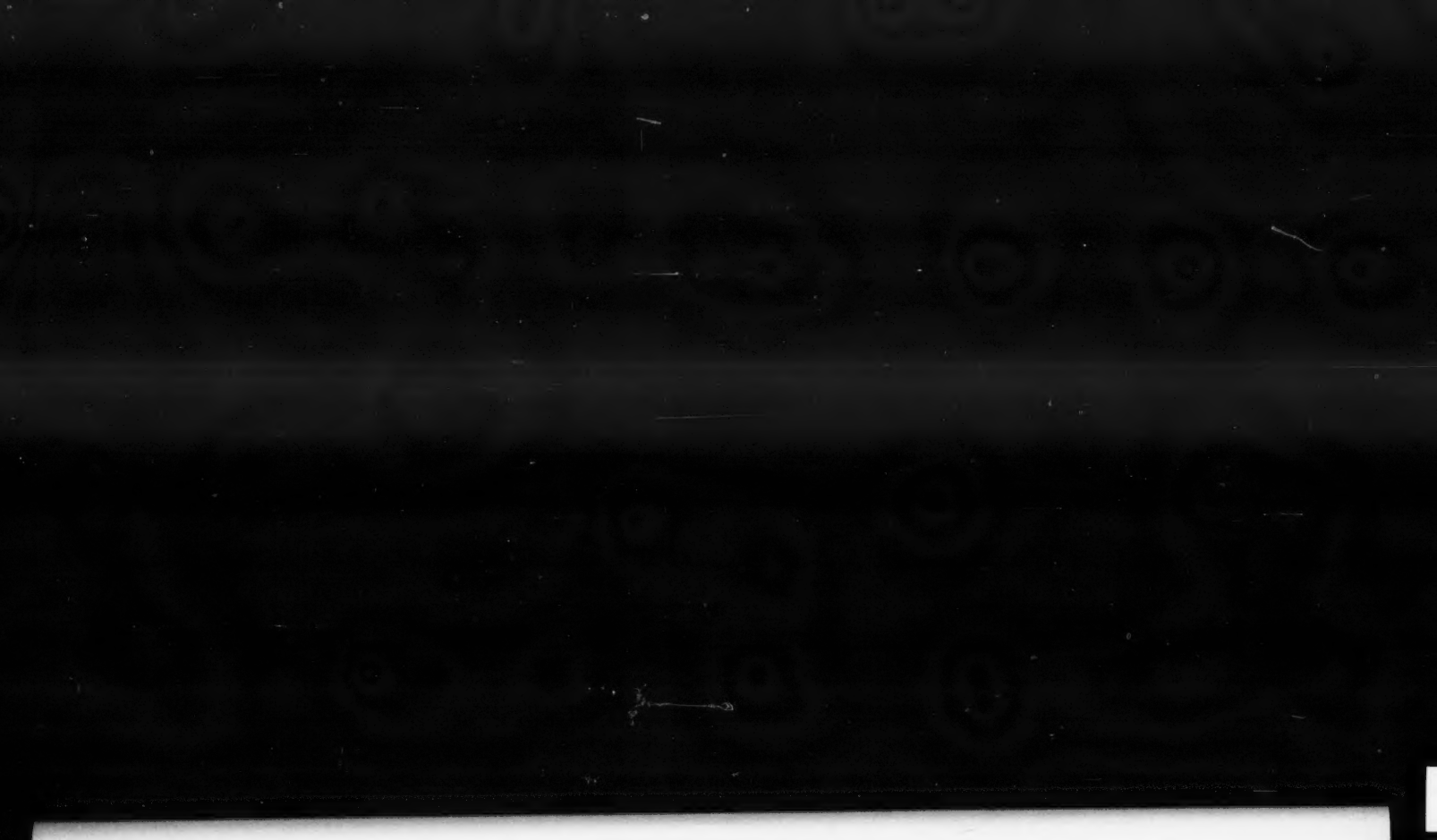


PLATE I.—Section of quarry workshop as exposed by excavation. *A*. Mica Schists. *B*. Potomac (Mesozoic) Bowlder beds. C^1. Pre-artificial slope gravels. C^2. Deposits of shop refuse showing traces of pits. C^3. Materials rearranged by natural forces since the period of quarrying.



and upon the mesozoic beds at points where the cobble-diggers did not wholly penetrate them. We have no means of determining with precision the original thickness of this deposit at points where artificial disturbance has taken place. The condition of the remnants above and below indicate that the surface, when man first appeared to gather cobbles, was not greatly different from that of the present day. Additional reasons for this conclusion may be given: First, there can have been little reduction of the mass of the hill, because the artificial formations remain upon the slope, and that so completely that evidences of heaping up and excavation are not wholly obliterated; and, second, there is no possible way of elevating the profile by natural means, since there is but a meager mass of material above to draw from; besides, if filling had occurred, the artificial profile would have been obliterated as surely as by degradation.

Adopting the assumption, therefore, that the profile of the hill and the general relations of the principal members, A, B, C, of the section were the same when man first appeared as they are now, let us briefly note the work accomplished by his hands: Throughout all the unnumbered years that have elapsed since this little valley was definitely outlined, the formations of the upper slopes, including the bowlder beds, have been disintegrating and sliding or rolling down toward the rivulet. My examination has shown that the bowlders lodged in numbers at all levels, and thus became imbedded in the slope gravels; but it is probable that the bowlders were more numerous than elsewhere below and near the immediate base of the outcrop from which they were derived—that is to say, about midway in the slope. Howsoever this may be, it now appears that the bowlder-hunter has worked over this part of the slope, and that millions of worked stones and unshaped fragments now occupy the site.

In cutting the section from below, the first positive evidence of ancient excavation was encountered at about the twenty-fifth foot, and from this to the fortieth foot this work had reached five feet in depth beneath the present surface. At the fiftieth foot it had reached five and one-half feet, and at the sixtieth foot it was six feet deep and had penetrated the gravels and the Potomac beds beneath to within one foot of the underlying mica schist. At the seventieth foot the overlying formations had been entirely penetrated, and the ancient workman stood upon the mica schist, nine feet below the surface, and there shaped his rude stone tools. At the seventy-ninth foot

we encountered the face of the Potomac bowlder bed, an uneven wall some ten feet in height, composed of ovoid quartzite bowlders, many of which are wonderfully adapted to the hand of the stone-age tool-maker. They are firmly imbedded in a matrix of argillaceous sand. Here was the quarry face of the ancient miner. Facing a wall like this, he was in a position to supply the whole ancient world with the raw material for one of its most important arts.

Now the analysis of the phenomena here encountered has been made with the utmost care, and I have called upon our foremost scientists to witness every feature of interest.* First in importance are the evidences of deep quarrying. In the vertical walls of our excavation the sloping sides of the ancient pits are clearly defined by layers of differently colored earths, and the beds and masses of refuse from the workman's hands are not changed in their relations and hardly changed in their appearance since the day they were deposited. Masses of shop refuse were encountered at every step of the excavation and had the appearance of pockets, as shown in the section, Plate II, which represents the front wall of the trench at the seventy-fifth foot.

The lower pocket of refuse shown in this section was eight feet below the surface and rested almost upon the surface of the schists. It had been thrown against one side of the pit-bottom, and was upward of two feet in depth. It consisted of bowlders, whole and broken, and fragments in all stages of manufacture, including numerous well-shaped forms and many chips.

A remarkable feature of this pocket of shop refuse was the openness of its interspaces. Animals as large as rats could have entered the openings and meandered the subterranean passages with ease. This feature is well shown in Plate III. Upon this loose heap of débris irregular layers of earth and and gravel containing a few bowlders were superimposed, and upon these again another bed of artificial refuse, of great extent and thickness, had been thrown. The position and nature of this bed is shown in the middle part of the section. Here both rude and well-shaped relics of art were very numerous, and flakes and fragments were innumerable. The walls of the pit in which they accumulated are clearly defined to a height of six feet.

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* Mr. W J McGee took exceptional interest in the work and his advice and assistance have been of the greatest service. It is gratifying to be assured of his concurrence in my conclusions regarding the quarries and quarry products.

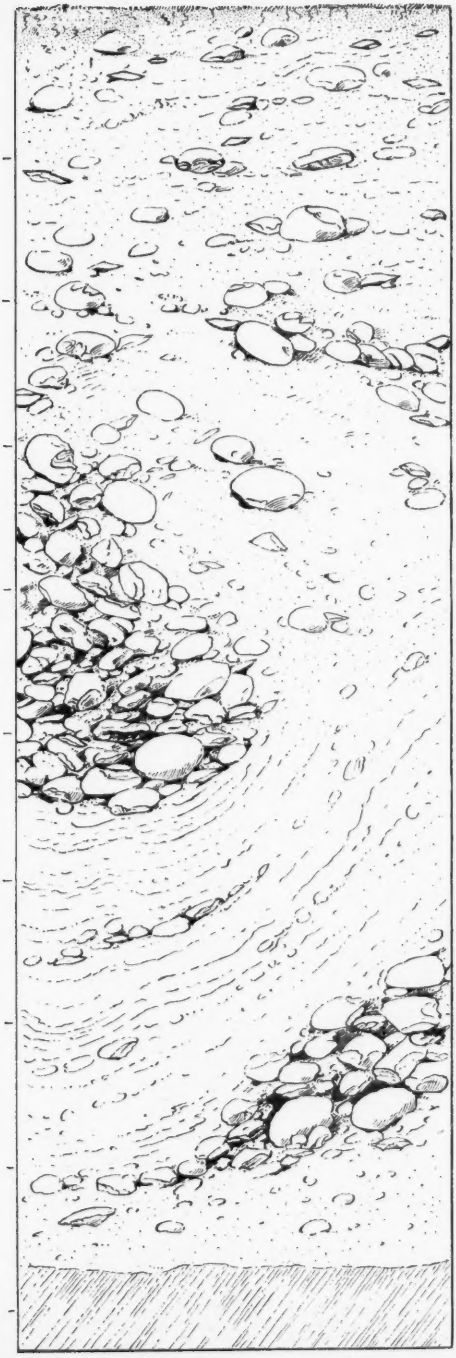


PLATE II.—Front wall of excavation at 77th foot, showing pockets of shop refuse.

Over this and extending to the surface are two or three feet of heterogenous deposits, consisting of coarse and fine gravels well stocked with all forms of artificial refuse. The upper part of these beds belongs to what I have called the post-artificial deposits as apparently they have been rearranged by natural means. The line separating the distinctly artificial from the rearranged or natural is too indefinite to be fully made out. It is generally not far from the bottom of the vegetable mold, which varies from two to fifteen inches in thickness, save where pits existed at the time of abandonment, where it is necessarily deeper.

The magnitude of the work accomplished by the ancient miners will be realized when it is stated that my trench crossed a belt of worked material fifty-five feet wide and, on an average, upwards of six feet deep, and that this belt extends horizontally along the bluff for an unknown distance. Judging by surface indications, it may extend half a mile or more.

The work of excavation does not seem to have begun at the lower edge of the worked belt next the stream and to have been carried up the slope and against the face of the bowlder outcrop, but to have been carried along the slope from right to left, the gravel having been worked backward and downward as the pits advanced, filling up, to a great extent, the earlier excavations.

As to the ancient methods of excavating the pits and moving the material we have learned but little. No remnants or trace of tools have been found. Wooden utensils, such as a primitive people might devise, would have served to loosen the bowlders and remove the earth and refuse. Stone tools would hardly have been employed, as it would be folly to jeopardize finished stone implements in the rough work of quarrying and fracturing bowlders.

The conditions seen at this point and recorded in the sections are representative of the whole site, so far as examined, and I need not here go into greater detail.

ART PRODUCTS.

We pass naturally from a study of the general features and phenomena of the factory site to an examination of the articles manufactured—to a consideration of the origin, development, and destiny of the stone implements produced. I wish here to call especial attention to the fact that perhaps never before has such an opportunity to study these latter points been presented to an American archæ-

ologist. Heretofore we have been called upon to lament both the meagerness of our material and the incomplete character of the evidence concerning it. In the present case there is an abundance of material and a completeness and clearness of evidence that leaves nothing to be desired.

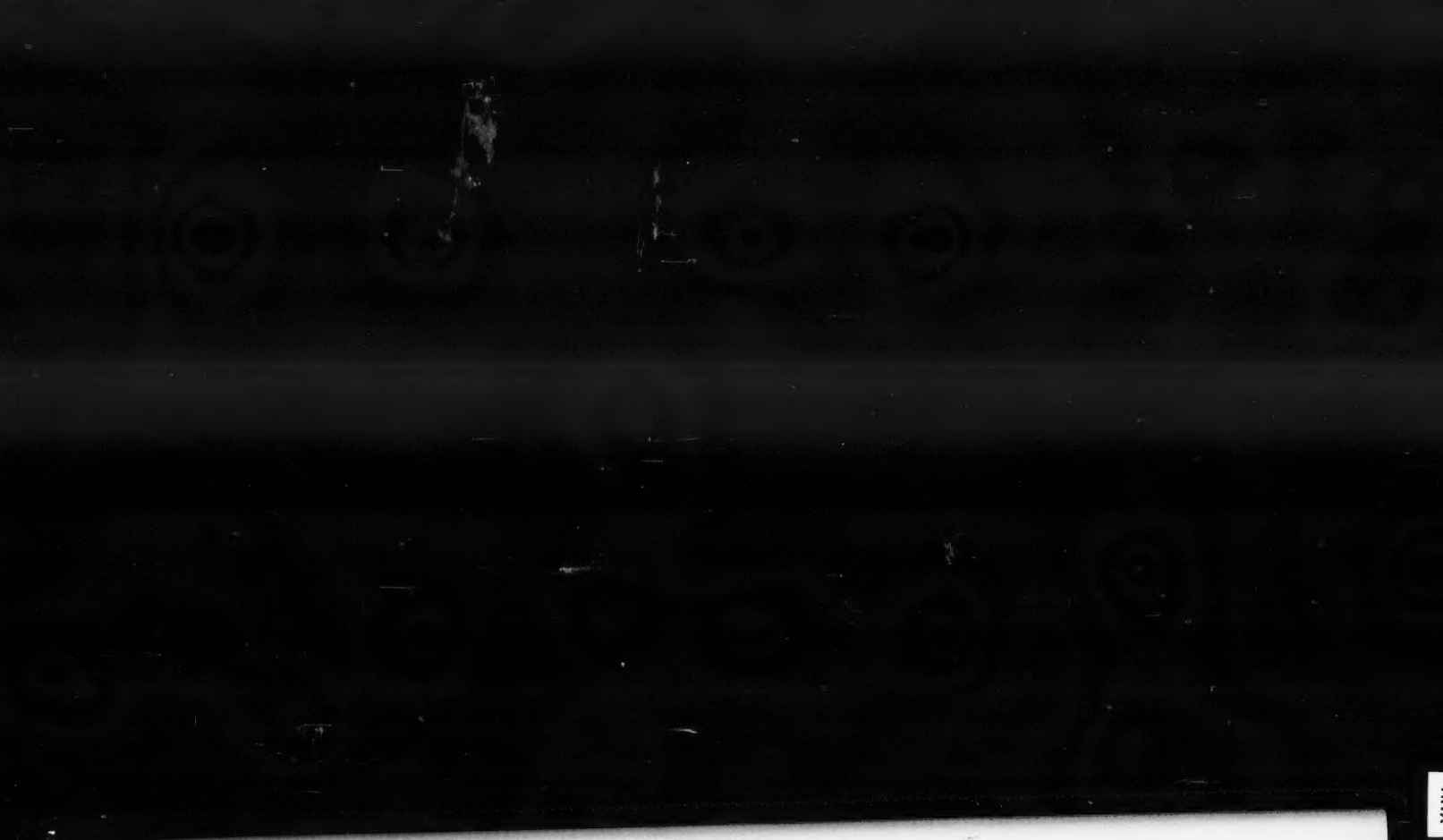
From a trench three feet wide and fifty feet long cut through the artificial deposits of this slope I have obtained nearly two thousand worked stones, all exhibiting design, and have examined a thousand cubic feet of material, all or nearly all of which had been worked over by the ancient quarryman, and fully one-tenth of which consisted of artificial fragments.

If other parts of this promontory face are as well supplied with artificial products as this one—and the indications are that such is the case—we can safely estimate that the site contains over a million finished, unfinished, and broken implements.

Of almost equal importance is the fact that this is an undisturbed quarry workshop which contains in one form or another multitudes of examples of each and every form made, as well as all the tools used in the making, and as it is not on a village site, and probably far from one, it is wholly free from domestic refuse and from all other exotic products.

The unexampled simplicity of the conditions is further emphasized by the fact that but one material—and that in one form—was used, and still more, that but one kind of machinery and one process were employed in all this great factory; and, furthermore, I may add, in advance of proofs which are forthcoming, there was but one period of work, and that by one race, whose clever artists had in mind, so far as this shop was concerned, but one ideal. The value and importance of this simplicity of condition will become more and more apparent as we advance in the investigation.

The material quarried and used was quartzite, a flinty sandstone. It was in the form of small ovoid bowlders worn down by the action of water. These bowlders were worked into desired shapes by the artist, and the tools he had to work with were also bowlders identical in every way with those worked; and of prime importance in this discussion is the additional fact that the process employed was exclusively fracture by free-hand percussion, the act being a quick, firm stroke, regulated in force by the nature of the resistance to be overcome and by the result desired. I have found absolutely no trace of other kind of procedure.



PLA
b
p

PLATE III.—Portion of front wall of excavation at the 44th foot. Upper line of picture 2½ feet below surface of ground. Scale about ¼ nature. The shop refuse is seen to be uncompacted and open and a number of failures and fragments of unfinished tools are in sight.

The bold but unsymmetric outline of the tool, the haphazard arrangement of the strokes, and the width and irregularity of the flakes unite to preclude the idea that any process capable of adjusting the point of contact between the tool used and the article shaped could have been employed.

The first step in the classification and study of these implements, finished and unfinished, is to separate them carefully from the refuse. The line must be drawn, not between specimens showing evidences of work and those showing no evidence of work—for if this were done we would have to discuss a hundred tons of material—but between relics that bear evidence of design and those which do not. Many broken stones and flaked fragments and all chips show indisputable evidence of work, but their shape is not the result of design. A case in point is the stone from which flakes have been taken to be themselves shaped into tools. Such a stone, usually called a core, has a faceted appearance, suggesting design, but in itself it is not the result of design. Again, a flake or fragment broken from a tool already worked over will retain upon its outer surface a number of the facets of that tool, and thus to the careless observer it bears the appearance of having been itself subjected to the shaping process.

With these distinctions in mind, the archæologist has but little trouble in recognizing and separating all classes of products, and the uninitiated with a little careful study may readily learn to do the same.

Having handled the products of this shop constantly for a period of several weeks, I have familiarized myself with every variety of form and shade of contour, and do not feel the least hesitation in presenting the results of my selection and classification.

In Plate IV is presented a series of worked stones taken from this site, which represents every variety of product and epitomizes the entire range of form. Beginning with the bowlder *a*, from which two chips have been taken, we pass through successive degrees of elaboration, reaching final forms in *k*, *l*, *m*, long leaf-shaped blades. Profiles of the type specimens are placed at the right. These illustrations are one-half actual size and are far from satisfactory, as it is extremely difficult to secure good photographs of objects whose prevailing colors are greenish and brownish grays.

If it be asked how I know that this series is complete, I answer that quartzite, the material used, although so firm and indestructible,

is at the same time brittle. It is impossible to shape from it flaked tools, howsoever simple, and succeed in every case. Some—I may safely say many—are necessarily broken, and the discarded remnants tell the story. A careful study of every shade of form shows that more are broken than remain in the workshop entire, and I may add that had every entire flaked tool been taken from the spot the record would remain, and with a certainty that is absolute.

Referring again to this series, we see that the process of manufacture and the steps of development are essentially as follows:

Grasping a bowlder in either hand, the first step was to strike the edge of one against that of the other at the proper angle to detach a flake. The second step and the third were the same, and so on until the circuit was completed. If no false step was made and the stone had the right fracture, these few strokes, occupying but as many seconds, gave as a result a typical turtle-back—a bowlder with one side faceted by artificial flaking—the other side, save through accident, remaining smooth. If the removal of a single row of flakes was not satisfactory, the work was continued until the availability of the stone for further elaboration was properly tested. This completed the first stage of the manipulation. A type profile is illustrated in *n*.

If the results thus far were satisfactory the stone was turned in the hand, and by a second series of blows the remaining smooth side was flaked away, and the result was a two-faced stone or double turtle-back. With, perhaps, a few additional strong strokes the rough stone began to assume the outlines of the final form, and the second stage was soon completed, a type profile being seen in *o*. If at this stage, and I may say if at any preceding stage, the stone developed defects or unmanageable features—such as too great thickness, crookedness, or humps that could not be removed—it was thrown away and thus became part of the refuse; and it would appear that all the entire specimens collected belonging to these two stages, since they were taken by us from the refuse, did develop some of these failings, and the same may be said of their 500,000 brothers and sisters.

If, however, the form developed properly, the work was continued into what I have called for convenience the third stage. It consisted in going over both sides a second and perhaps a third time, securing, by the use of small hammers and by deft and careful blows upon the edges, a rude but symmetrical blade. A profile is given

Notes on Plate IV.

In this plate is presented a series of forms epitomizing the quarry workshop rejects and indicative of successive steps in the manufacture of implements. The scale is about one-half nature. Flakes and other fragments not exhibiting design are excluded.

a. Bowlder with two flakes removed; probably rejected because of coarse grain and difficult fracture. This bowlder, which is four and one-half inches long, three and one-half inches wide, and nearly two inches thick, is of typical shape and of nearly average size. The largest worked specimens are about one foot in length and the smallest not above an inch. Such extremes are rare.

b, *c*, *d*. Specimens worked on one side only and probably rejected on account of perverse fracture or excessive thickness. A profile is shown in *n*.

e. A few flakes removed from the back; fracture perverse.

f, *g*. Carefully worked on both sides, but still excessively thick, hence the rejection.

h. Broken by a stroke intended to remove a prominent hump. Profile shown in *o*.

i. Neat in shape but with a high ridge or hump on the back which many strokes have failed to remove. This piece could as well be classed with the second group as there is no very definite line between it and the third group.

j. Unsymmetric broken blade.

k, *l*, *m*. Thin, neat, broken blades. These must have been very near completion, so far as free hand percussion was concerned, as they are neatly flaked over the whole surface and are quite attenuated. That they were unfinished is indicated by the fact that they were broken while still under treatment. Their thickness is indicated in *p*.

To the first and second stages of manufacture belong many very rude, irregular, and broken forms that could not be represented in this series.

The last specimen of the series, *m*, is perhaps the most advanced form found, but that is was not finished is clear not only from the fact that is was broken by a strong blow while still under treatment but from the unfinished character of the point and portions of the edge.

It is highly improbable that we have in the whole series of products of the quarry, here epitomized, any finished tool, either whole or represented by fragments. This should not be regarded as an opinion merely; it is a conclusion based upon evidence that cannot be lightly treated by the scientific investigator.

in *p*. If, even at this stage of advancement, it was vitally defective, it was either broken in the attempt to correct the defect or was thrown into the heap as useless.

Four broken specimens that approach very closely the quarry-shop ideal are shown in *j*, *k*, *l*, and *m*. No good example of this class was found entire, and illustrations had to be selected from the broken specimens, both halves of which happened to be recovered, or from single halves. In nearly all cases such specimens have a broad end and a pointed one, and these features were generally foreshadowed in the first stages of manufacture, and were kept in view throughout the progress of the work. These blades vary from two to five inches in length, and are generally under two inches in width and less than one-half an inch in thickness. It was requisite that they should be straight and symmetrical, and that the edges should have a bevel as slight as consistent with needful strength. Only one piece was found that had been carried beyond this stage, a rude stem having been worked out at the broad end. This specimen was found near the surface. Two other pieces, found at considerable depths, exhibit slight indications of specialization of form, which, however, might have been accidental.

And now, having followed the process to the end, I wish to call especial attention to the fact, if my view be correct, that when this thin blade was realized the work of this shop and the only work of this shop, so far as shaping is concerned, was ended. The process and the machinery had accomplished all that was asked of them and all that they were capable of accomplishing. The neat, but withal rude, blades, and they only, were carried away, and that to destinies that we may yet reveal. Further work, additional shaping, if such there was, employed other processes and was carried on in other fields.

The course of procedure just described I have investigated in the most careful manner, and by experiment have followed every step of the process, and have achieved almost every result. I have found that in reaching one final form I have left many failures by the way, and that these failures duplicate, and in proper proportions, all the forms found upon the site.

I further find by these experiments, and the fact is a most important one, that every implement resembling the final form here described made from a bowlder or similar bit of rock must pass through the same or much the same stages of development, whether shaped

to-day, yesterday, or a million years ago; whether in the hands of the civilized, the barbarian, or the savage man.

Now with these facts clearly in mind, it seems almost superfluous to expend additional words in showing that all forms found in the workshop other than the thin blades accidentally lost are mere waste; but in a matter having so important a bearing upon the very foundations of our study of primitive archæology no point should seem to be slighted.

It causes me almost a pang of regret at having been forced to the conclusion that the familiar turtle-back or one-faced stone, the double turtle-back or two-faced stone, together with all similar rude shapes, must, so far as this site is concerned, be dropped wholly and forever from the category of implements.

Our utmost effort cannot wring from them a fact or a suggestion of value upon any of the great questions of time, race, and culture, and it follows that what is true of the rude forms of this particular locality may be true also of all similar forms found throughout the Potomac valley.

But why should we regret such a conclusion? If the simple-minded savage, who laboriously quarried and shaped these forms, cast them at once and without hesitation into the refuse literally, there can be no sound reason why we, as searchers after truth, should hesitate to do the same thing scientifically.

I have obtained from this one small spot, less than twenty square yards in area, fully 1,000 turtle-backs of the two forms—a greater number than has been collected heretofore in the whole Potomac province. And why? There can be but one answer. This spot is a great workshop where tools were shaped or, rather, roughed out, and these things are the failures. The soundness of this view is further proved by the fact that these forms are not found carefully deposited in clusters or caches, but are distributed with considerable uniformity throughout the mass of refuse from top to bottom and from end to end.

But there is additional confirmatory evidence. I have prepared a statement by means of which some important facts will be made apparent. In this case the great importance of having at hand a large and exhaustive series of the art products of a veritable workshop becomes apparent.

As already seen (see Plate IV), I have divided the shaped forms into three classes, which are separable by well-marked steps or stages

of manufacture. In the series here presented four are of the first stage, four are of the second stage, and the remainder of the third stage. It is not convenient to divide the series differently or more frequently.

The relative numbers of these three classes found within the trench are given below. Halves in each case are recorded, as they serve to point out an important fact.

Of the first stage there are 380 whole specimens and 460 halves.

Of the second stage, 250 whole specimens and 320 halves.

Of the third stage, 12 whole specimens and 380 halves.

It will be noted that of the whole specimens of the third stage there are but twelve representatives, and I may add that these are comparatively rude, and with two or three exceptions can as well be classed with those of the preceding stage. Practically, therefore, there were no examples of the successful quarry products left upon the ground. All forms available for further shaping or for immediate use, as the case may be, were carried away as being the entire product of the shop, the only reward for the long-continued and arduous labor involved in their production.

Now these three stages do not necessarily represent the full scope of the art of the ancient tool-maker, and in this connection it is of the greatest importance that we should keep in mind the fact that this site is only a quarry workshop, which was naturally not a place for finishing tools, but one for roughing out the material and selecting that fitted to be carried away for final finishing. A laborer engaged in such work in a pit in the forest would not be likely to throw aside the rough hammer used in fracturing cobbles to take up and operate an entirely different kind of machinery, involving a distinct and delicate process. Being a reasoning and practical creature, he would carry away the roughed-out tools, the long, thin blades, to be finished at his leisure and by whatsoever method custom had placed at his disposal.

It may be well just here to define with some care the apparent limitations of the classes of procedure concerned in the manufacture of flaked tools.

Direct or free-hand percussion is the natural method of reducing large amorphous masses to something approximating the special shapes reached in the advanced stages of the art. It was probably the only method known in very early times; but this process, even in the most skillful hands, has its limitations in certain directions. For

example, blows cannot be given with sufficient regularity to secure great symmetry of outline and uniformity of flaking; and, again, when implements under treatment become attenuated the sharp blow is extremely liable to shatter them. The skill of the artificers being equal, these limitations vary with the degree of brittleness and homogeneity of the material used.

In the case of quartzite, free-hand percussion cannot accomplish more than the merest roughing out, as the material is extremely fractious; but it is equally true that by more refined methods as great or even greater difficulty in shaping this material would be encountered, and the skill of the workman must have been tried to the utmost to carry the manufacture by the first process to a stage where the other methods would be operative. It is probable that some method employing indirect percussion may have followed that of direct percussion. By indirect percussion I mean the use of two tools, one the hammer and the other the punch, the latter being set upon the exact spot to be fractured, thus eliminating the element of uncertainty characteristic of the free-hand blow, although at the same time losing a large part of the percussive power.

By the latter method, if not by the first, the rude quarry blades could be carried to a degree of symmetry and attenuation that would enable the artist to employ to advantage a bit of notched bone or a like device, and thus to carry the tool to the highest possible degree of specialization and finish.

At any rate, it is clear that the quarry forms bear no evidence whatever of that regularity and refinement of flaking and that neatness and symmetry of form that characterize results by these latter methods,

And now what of the probable destiny of the quartzite blades that, as we have seen, were graduated from the school of direct or free-hand percussion? Am I correct in the assumption previously made that they were carried elsewhere to be finished by more gentle methods of manipulation, or were they already finished and ready to go into the service of their rude owners?

There is a wide-spread impression that quartzite tools related to this quarry form are not found upon village sites in this vicinity, and that they are not generally distributed over the hills and valleys; but I find upon examination that this assumption is entirely without foundation, and that not only this form, but all others ranging from it down through the specialized and minute forms, occur in many places and in great numbers.

But I must add that to a limited extent the rude forms—the turtle-back and its near relatives—are also found widely scattered over the Potomac valley outside of the shops in the hills. This would seem to conflict with my former statement that all of these rude shapes are failures and were left upon the factory sites.

It is time, therefore, that I should define a stone-age workshop. It is any spot where an individual desiring to make an implement picks up one or more bowlders or bits of stone and proceeds to shape what he desires. It is a shop just the same if thousands of rocks and hundreds of men are concerned. It is a quarry workshop if the raw material is secured by means of excavation or is broken from masses of rock before the shaping begins.

Bowlders and bits of workable rock, singly or in numbers, are scattered over the face of the country—on the beach, on the river banks, in the woods, in the green fields, and on village sites. If rude, unfinished forms are not found on some village sites it is very probably because material suitable to be worked was not found upon the spot. I venture to surmise that upon extensive areas of alluvial land where the raw material is very scarce the rude forms of tools will be exceedingly rare, although all post-quarry and final products abound.

In this part of the valley shop sites are very numerous, and wherever they occur will be found relics representing the stages of manufacture—turtle-backs, double turtle-backs, and failures of every shape and kind, depending for their character upon the species and form of rock, the skill of the workmen, and the kind of tool designed; but in any case ordinary percussion was concerned in only the rougher work, and indirect percussion or pressure was employed in the final stages. The thick, clumsy forms are in every case mere refuse. There is so far no evidence that any inhabitant of the Potomac valley ever aimed to make by flaking alone any other than the attenuated forms, one-half an inch or less in thickness, such as we see in knives, scrapers, spear and arrow heads, perforators, and the like. Very rude forms may occasionally have been used in emergencies, or even may have been shaped for special uses of a local or temporary kind, such as quarrying soapstone or girdling trees; but the quarry forms here found were certainly not made to be used, and we have additional confirmation of this in the fact that it is exceptional to find examples of the class that show evidence of use, or even that were found in such situations as to indicate that they had either been used or valued.

A very large percentage of the chipped-stone forms found in our museums, and over which endless discussions have taken place, are only failures gathered from shop sites; while many others from shop sites and elsewhere are unfinished implements lost or thrown away before the final shape was reached. It was impossible to make these distinctions with accuracy until a veritable fossil shop-site, dissociated from other finds, was discovered and systematically explored. It may be said with much truth that the archæologist who studies flaked stones of any country without having made himself familiar with the functions and character of such a workshop is liable to make most serious blunders.

As a corollary of the determination of the true quarry product we arrive at the definition of a cache. The ordinary cache of stone implements is a cluster or hoard, numbering, perhaps, a score or more, which has been secreted or deposited in the earth by the owner, and who for some reason never exhumed it. Such hoards are frequently discovered by workmen in the fields.

Having reached a definite conclusion that the blades were the exclusive worked product of the quarry, I was led to investigate their subsequent history. The working of a quarry such as I have described led inevitably to the production of blades in numbers, and it follows that they were removed in numbers, since the supply for the entire year was to be obtained probably within a small fraction of a year, the working period being determined by the season, by tribal movements, or by other limitations of time.

In speculating upon the probable nature of the transportation, storage, and distribution of such quarry forms I happened to observe that they were identical in character with the objects usually contained in caches, and the conclusion was at once suggested that all such cache forms are quarry products—unfinished tools—varying in character with the material, the process, and the habits or needs of the people concerned; that they had been roughed out in numbers and to a stage of advancement that made them portable and at the same time placed them fully within the reach of the processes to be employed in finishing, and that they had been carried away to the villages and buried in damp earth, that they might not become hard and brittle before the time came for flaking them into the final forms required in the arts. The story begun in the quarry is thus expanded and the status of the cache tentatively determined.

The history of the quarry forms is not completed, however, until

we have noted their final distribution among the individuals of the various tribes, until we have witnessed the final step in the shaping process—the flaking out of specific forms with a tool of bone—and their final adaptation to use and dispersal over the country.

And now, hastening over this interesting field, the problem of age and race, so far as the results of this exploration relate to them, must be hurriedly examined.

AGE AND RACE.

The question of the antiquity of the period of occupation is one of paramount interest and importance. When it is fully and finally answered we shall no longer be uncertai as to whether our researches refer to a well-known people or to a race shrouded in a thick veil of mystery.

If the attainable evidence is against great age, or even if it is not decidedly in favor of great age, the natural conclusion is, or ought to be, that the race concerned is the Indian; for he is well known to us as an actual occupant of the region, and the period of his occupancy, while coming down to our time, and therefore recent, is not at all well defined in respect to the other limit. If, on the contrary, the evidence favors great age—if the latest limit of the period of occupation is remote and apparently far antedates the period of which we have historic knowledge—we shall not perhaps be warranted in identifying the ancient quarry-worker with the Indian, and ultimately may even find it necessary to refer him to another and earlier stage of culture.

Unfortunately we have in the Potomac valley but meager and imperfect indices of age. Geology, the great time gauge, is not known to have made a definite record since the first glacial epoch, a period antedating traces of man, and therefore important proofs of a geologic nature bearing upon this question do not exist, and answers to questions concerning remote chronology must be sought elsewhere. There are some minor records, however, pertaining to geology which are worthy of careful study.

The art relics from the site examined are, as we have seen, more or less intimately associated with three formations. Two are old, antedating the advent of man, and the other is now in process of accumulation and alteration under conditions that have been practically the same ever since glacial times. These associations, therefore, of themselves afford no assistance whatever.

An examination of the quarry-shop refuse makes it apparent that the period of occupation was very long. The accumulations of worked material are of enormous extent and remarkable thickness. Their general compactness is also a notable feature. At the same time it can hardly be claimed that these facts aid materially in settling the question at issue. The same may be said of the growth of forest trees upon the site. A fine chestnut tree fully a century old stands upon the surface of a bed of refuse which is filled with artificial remains, and that to a depth not even penetrated by the strongest roots; but the age of a tree or of many generations of trees will not carry us back beyond the period of the Indian.

The deposits are deep, but their accumulation may have been rapid, and the indications are strong that it was rapid. They are compact in parts, indicating, perhaps, a considerable lapse of time; but in other parts they are not at all compacted, and the pockets of coarse refuse are, as I have already shown, quite open and full of cavities—a condition not regarded by geologists as consistent with great age. So far as my excavations extend, there is no indication of a break in the period of occupation, and the implements are alike from bottom to top. Again, the evidences of accumulation and excavation are still apparent upon the surface, and this indicates a date the remoteness of which is to be reckoned by centuries rather than by tens of centuries.

That but a single stage of culture is involved and that a single race was concerned are clearly shown by the uniform character of the relics and the manner in which they occur. In one case a small pocket of refuse was encountered at a depth of forty inches, from which all the tools, flakes, and fragments were preserved. Subsequently, when these were washed and examined, they were found to include one entire typical turtle-back, which had apparently been thrown aside because of its great thickness; all the fragments of an implement quite well advanced in the second stage, but which had been broken in attempting to remove a hump, and a blade in the final stage which had been broken at the very verge of completion. The chips struck from these objects were in the cluster with them, and there can be no doubt that all these forms, covering the whole range of so-called tools from the rudest turtle-back to the final blade, were made by the same man and on the same day and probably within a single hour. Unity of time as well as of race are thus demonstrated.

The question as to the remoteness of the time has already been reviewed, and the question of the race concerned may now receive a moment's attention.

It would seem from what has been said that geologically there is nothing to carry the history of man in this place back beyond the age of the Indian, and that a number of things conspire to confine it to that period.

I find no evidence of a cultural kind that points significantly towards another race. Mining and quarrying are well-known accomplishments of the Indian, and on Rock creek and near at hand are soapstone quarries that no one would think of attributing to any other people. The mounds and shell heaps which are known to be of Indian origin bear equal or greater evidence of antiquity than do the remains upon this site.

The absence from this site, so far as known, of finished tools of flaked or polished stone and of pottery has given rise to the assumption that the race concerned did not make or use these things, and it is argued from this that they could not have been our Indians; but it would seem that there is really little apparent reason why any people quarrying bowlders and roughing out rude implements in the hills should carry finished tools into the pits, and there certainly would be no excuse whatever for having pottery there. Besides, it should be remembered that my excavations have been carried over a very small portion—one-thousandth part, perhaps—of the workshops, and that other classes of art remains may yet be found.

The unity of the art of the quarries so far as kown is, as we have seen, easily and conclusively shown. Is it not also possible to demonstrate the unity of the flaked-stone art of the whole Potomac province? A review of the field makes it clear that if the theory of the occupancy of this valley by an early man had not been suggested from without there would have been no occasion for asking such a question, for every appearance indicates homogeneity not only in art, but in race as well.

The flaked-stone implements of the region are readily grouped under a few heads, including knife-blades, scrapers, spear-points, arrow-points, and perforators. Other forms are known, but they are not of importance in the present study and at best were not standard products of the flaking art, but rather emergency tools made to answer some temporary or purely local purpose.

Two of the groups, the arrow and spear heads, are perhaps the

most numerous and important, as they naturally would be with a fishing and hunting race. They include wide but closely similar ranges of form, the two classes varying little save in size, and this difference may be easily accounted for by differences in the material. Quartz is fitted for the manufacture of small forms only on account of its brittleness, lack of homogeneity, and flawed condition, whereas quartzite is tough, coarse-grained, and fairly homogeneous, and while well adapted to use for large tools is difficult to shape into small or delicate ones. Jasper, slate, flint, and other rocks are comparatively rare and from necessity occupy a secondary place in our primitive art. To all appearance the differences in size are reasonably accounted for without appealing to distinctions in culture or race to explain them.

Now, for the purpose of securing another point of view from which to study the quarries and the quarry products, let us suppose that no example of the workshops had been discovered, and that the source of supply of the raw material was wholly unknown. Viewing the vast number of spear and arrow heads of quartzite found scattered over the hills and valleys and taking into account the multitude that still lie buried in humus and alluvium, the question would naturally arise, where are the sources of the material, and where are the great quantities of refuse that must have resulted from such extensive manufacture?

Nearly all of the quartzite found in this region is in the shape of bowlders, and we are safe in concluding that in the manufacture of ten thousand tools—a moderate estimate of the number lost within this valley—hundreds of thousands of failures were made and millions of flakes and fragments were left upon the ground. It has been observed that these bowlders are scattered over the surface of the country, and in many places they have been worked, but they occur in very limited numbers, and having been seasoned by long exposure they are extremely difficult to reduce to desired shapes. Through the investigation of Mr. McGee we have learned that the area affording a plentiful supply of quartzite bowlders of a size suitable for use in shaping tools is very limited, and that it is confined to the bluffs of the Potomac river within and immediately below the District of Columbia, and it follows from this that the factories where implements were made and the refuse resulting from the manufacture must be found within the range of vision from our house-tops.

But, as we have seen, the quarries and factories have actually been found, and it is ascertained that they answer in every way the requirements of the case.

Every quartzite point made from a bowlder had to go through all the stages of manufacture already carefully described, and with these quarry workshops in sight it would be absurd to still ask where and how these implements were made. It is impossible to escape the conclusion that these quarries were the source of the material, and that here the implements were roughed out, and the presumption is very strong that the quartzite art of the valley is a unit, and that but one people was concerned in the manufacture and use of the implements.

It follows still further, since the quartzite shapes are identical with those in quartz and other materials, that the chipped-stone art of this valley is practically a unit, and that nothing short of the discovery of wholly new evidence will make the theory of occupancy by another race than the Indian tenable.

Notwithstanding the apparent conclusiveness of the evidence of ethnic and cultural unity, the lessons derived from other regions should not be disregarded. The interpretations placed upon implements found elsewhere and corresponding closely to ours are eloquent of the history of early races and of the evolution of culture.

Many of the rude implements of the Seine—assigned to a great antiquity and to an unknown race—are nearly identical with our quarry forms. On the Thames the analogues of nearly all classes of rude implements are found in the high, level gravels, thus carrying history back with certainty to remote ages. In the Delaware valley the rudest forms, corresponding to our failure shapes, are obtained from glacial gravels, and the less rude varieties occur in more recent formations or under conditions that seem to make them safe indices of the steps of progress. In the Potomac valley, on the other hand, all the rude forms appear to be but failures or unfinished pieces representing stages in the manufacture of arrow and spear points of the Indian.

In view of this apparently anomalous state of affairs it may be held that as in biology the growth of the individual epitomizes the successive stages through which the species passed, so in art the flaked-stone tool of the highest type advances through stages of manufacture each step of which illustrates a period of human progress in culture.

It should be remembered, however, that the investigations of this locality are not yet completed, and that in view of this fact it would be unwise to assume that in all cases final results have been reached. It is quite possible that our chipped implements are in a measure separable into chronologic or cultural groups, for the American Indian did not always occupy one plane. In common with other divisions of the human family he must have risen by degrees from lower to higher levels of culture. The chipped-stone art, however, in itself a simple one, may have reached comparative excellence rapidly and in very early times, and far in advance of more complex and less practical arts. In any event it is probably not very sensitive to cultural changes, and may have remained for a long time practically stationary while the procession of other arts moved steadily on.

It is believed by Mr. McGee that the river gravels formed in the Potomac valley since the first ice epoch and possibly containing evidences of early man have been depressed beneath tide water. If such is the case, we are as helpless here as our confreres at Trenton would be if the estuary gravels of the Delaware, now yielding such important finds, had sunk wholly from sight in pre-Columbian times.

It is within the range of possibility that other classes of evidence may yet be forthcoming. The discovery of shelters, caves, or village sites occupied by distinct peoples or by the same people at widely separated periods, or of human remains in connection with the remains of extinct animals, would throw new and strong light upon the early history of man in this valley.

As to the present state of the evidence, I hold that there can be but one opinion. It is impossible to show that there exists the slightest trace of any other race than the American Indian as he is known to us, and I am convinced that if the great Powhatan should at this late day rise from the dead and claim for his people all the stone implements of the Potomac valley no reasonable objection could be made to the claim.

SUMMARY.

And now a few of the salient points brought out in the preceding pages may be recalled:

A quarry workshop of the flaked-stone implement makers has been identified, examined, and described.

The quarrying is found to have been extensive and the remains are of surprising magnitude.

The manner of quarrying, the material quarried, and the purpose of quarrying have been studied.

The processes of manufacture have been determined and the articles manufactured have been described.

It has been shown that percussion was used exclusively, and that any people chipping ordinary implements from bowlders must necessarily follow the same steps and reach similar results.

It has been shown that a well-marked distinction exists between quarry work, which is a roughing out by percussion, and the after shaping and finishing of special forms, which is accomplished chiefly by gentle means, such as pressure, and that it is highly improbable that the latter work would be conducted upon the same site as the former.

The true nature of a workshop has been defined, and the occurrence of rude forms or failures in or their absence from certain localities is thus reasonably accounted for.

It has been shown that the blade alone was carried away from the quarry, that it is the cache form, and that it, with the whole range of forms naturally derived from it, are found upon village sites and elsewhere.

That all or nearly all our quartzite tools have been derived from bowlders obtained in the Potomac valley near Washington, and that there is every reason to believe that these quarries on Rock creek are the main source.

That all chipped implements known to have been generally used in this valley are thin forms, such as the knife-blade, the spear-point, the arrow-head, the perforator, and the scraper, and that all these are typical Indian forms, and that the art remains are practically a unit.

That the existence here of another and a more ancient race than the Indian has been predicated upon a class of objects which, being mere refuse, have of themselves no ethnic or chronologic significance whatever.

That our geologic evidence is extremely slight, but that what there is seems to be rather against than for great age for the period of occupation.

And, finally, that all visible evidence so far collected, chronologic, cultural, and ethnical, point to the Indian as the laborer in these quarries and as our only predecessor in the Potomac valley.

In conclusion, let me say that I am ready to modify any of the above statements, inferences, and conclusions when the facts are found to warrant the change, and that I shall seek earnestly for evidence of antiquity, and shall heartily welcome the appearance of an early man upon a field of investigation whose interest will be quadrupled thereby.

IN NEARLY every community may be found one or more enthusiastic devotees of archæologic research, many of whom are actively engaged in collecting relics of ancient art. It is rather exceptional, however, to find the work systematically carried on; to find adequate records kept and proper care taken of the collections, and these are prime considerations to those who would make their treasures available for scientific purposes. It is the collector who attends to these matters, and especially he who at the same time devotes himself to particular localities, who becomes in time the benefactor of archæologic science.

The Potomac Valley is a fine field for the collector and student, and this fact becomes more apparent every year. From the Apalachian region, meandered by the Upper Potomac, Mr. F. M. Orfut, of Cumberland, has amassed a most valuable collection. Mr. Hallett Phillips, S. V. Proudfit, and E. R. Reynolds, of Washington, have each a large series of valuable relics. That of Mr. Phillips illustrates a narrow belt bordering the banks of tide-water Potomac, while the others are somewhat more general. The collection of Mr. J. D. McGuire, of Ellicott City, Maryland, is more than usually important. It represents the region lying between Chesapeake Bay and the Lower Potomac, and is noticeable for a number of unique features. Among these is a series of the products of the ancient soapstone quarries of the region, including many roughed-out pots and a remarkable series of rude pick-like tools of stone, used in quarrying and shaping the vessels; also a number of superb sets of cache finds.

Mr. N. S. Way and Mr. Wm. Hunter, of Mount Vernon, and Mr. O. N. Bryan, of Marshall Hall, with several others, have done excellent work, and many of these gentlemen have contributed all or a large part of their valuable finds to the National Museum.

W. H. HOLMES.

ANTHROPOLOGY IN PARIS DURING THE EXPOSITION OF 1889.

BY OTIS T. MASON.

The opportunities to study the natural history of man in Paris during the Exposition, and especially in August, when the great Congresses and the French Association held their sessions, were unparalleled in the history of anthropology. At any time the French capital affords rare advantages to the anthropologist. The Musée and Laboratoire Broca, the anthropometric operations of Bertillon in the Palais de Justice, the courses of lectures in the École d'Anthropologie, the collections in the Jardin des Plantes, the facilities for original work in the Écoles de Medicine, and the hospitals give to the comparative anatomist and biologist abundant employment.

The museums of human arts, however, are the crowning glory of Paris. In them may be traced the whole history of France from the first human action to the latest exposition; and they are so divided in function that the work of one does not interfere with the work of the others.

To examine them in order one should commence with the palace of St. Germain-en-Laye, 13 miles from Paris by rail, omnibus, or boat. This beautiful structure was erected by Francis I for a royal residence. Here were born Henry II, Charles IX, and Louis XIV, and here died Louis XIII. Surrounded by a park of ten thousand acres stands the building in which may be read the material record of France down to the beginning of the Middle Ages. In one of the upper halls, arranged in the most perfect order, is the story of the Stone period. Here in the upper left-hand corner, as on a printed page, you begin with the burned and wrought flints of the Abbe Bourgeois, to which archæologists go for proof of the existence of man in early Tertiary. You will have no difficulty in finding your way around the hall, but the Congrès d'Anthropologie were so fortunate as to have the venerable G. de Mortillet as guide, who organized and arranged the exhibits with his own hands.

Few of the men who heard his address in August last will soon forget his earnest manner and confident air as he explained and defended the classification, now generally adopted for European

archæology. Some of the eminent and world-renowned exhibits in this hall are the finds of Boucher de Perthes, at Abbeville, and the relics of Solutré, and of the caves of Western France.

The Director of the Museum, M. Alexander Bertrand, honored the Congrès with his presence, but the task of conducting the members through the halls devoted to the Bronze Age, the Roman period, and the early Christian occupation of France, devolved upon Dr. Reinach, one of the rising young archæologists of Paris, whose familiarity with the subject is only equalled by his enthusiasm and his eloquence.

Some of the members of the Congrès had taken an early train to St. Germain so as to spend the whole day on the ground. They were amply repaid for their pains, and the American delegation, especially, were astonished to see twelve large halls devoted to a department of anthropology which in Washington is confined to one.

Before leaving the subject of the Stone Age, we must not forget that special problems in archæology arise upon the very site of Paris. The Seine gravels and their revelations are illustrated in the St. Germain Museum, but the Congrès dovoted one day especially to the explorations in this region, and adjourned at the invitation of Count D'Acy to examine his private and unique collection from the Seine valley around Paris.

The advantage of studying this vast material in company with the most learned men in the world and under the guidance of the distinguished explorer himself was fully appreciated by all participating.

To continue the study of French history it is necessary to pass from St. Germain to the Palais Thermes and Hotel de Cluny. The most ancient Roman monument in Paris, known as Palais des Thermes, was erected in the first year of the fourth century. Its construction is attributed to Constantius Chlorus, father of Constantine, who died in 306, and it is the last vestige of the vast structures erected by the Roman emperors on the site of ancient Lutetia.

It embraces great buildings, baths, and gardens of immense extent, and during several centuries was the residence of the first and the second lines of French kings.

The Hotel de Cluny, erected for the most part on the ruins of the Roman palace, dates from the second half of the fifteenth century and is the sole specimen of the second Gothic period now intact in Paris.

In 1833 M. du Sommerard chose the old establishment as an asylum for his collection of objects illustrating the art of the Middle

Ages and of the Renaissance. This collection was acquired by the State in 1843 and the new museum was founded under the name of "Musée des Thermes et de l'Hotel de Cluny." The galleries of the hotel have been restored and the collections arranged to suit the buildings. In the vaults of the old Roman palace are disposed all the monuments in stone belonging to the Gallo-Roman and the following centuries, the Roman altars erected to Jupiter by Parisian sailors in the reign of Tiberias, the marble columns of the temple on whose ruins was built the church of Notre Dame de Paris, sculptures from St. Germain des Pres, St. Jean de Lateran, St. Benoit, and other ancient buildings of Paris, and Gaulish monuments from other parts of France collected by M. E. de Sommerard.

In the galleries of the Hotel de Cluny are the relics of the Middle Age and of the Renaissance in stone, wood, ivory, enamel, glass, faience, jewelry, armor, and weapons.

The age of the Palais de Thermes helps one to remember that the dividing line between St. Germain and Cluny is about the sixth century. To one who loves to trace the growth of ideas and inventions this is indeed a marvelous place. The arrangement is by arts and by ages, so that the ceramist, the metallurgist, the woodcarver, and the embroiderer enjoy the best opportunity to study the results achieved in each art during a millennium.

The best displays of Gallic art triumphs in the modern period must be studied in the Louvre Museum of Painting, Museum of Drawing, Museum of Engraving, Museum of Antique Sculpture, Museum of Middle Age and Renaissance Sculpture, Museum of Modern French Sculpture, Museum of Assyrian Antiquities, Museum of Egyptian Antiquities, Museum of Greek and Roman Antiquities, Algerian Museum, Naval Museum, and Museum of the Sovereigns.

Still more actively associated with the history of French thought and ingenuity are the Palais de Luxembourg, where are to be seen the works of living artists, which have been purchased by the government after the annual exhibitions, in the Gobelin tapestry works, the Sèvres potteries, and a thousand other busy hives which I cannot stop to mention.

The later studies of criminology, poverty, delinquency, fecundity, longevity, vigor, stature, &c., all included in the two terms anthropometry and demography, find their best illustrations in such operations as those of Alphonse Bertillon in the Palais de Justice and the studies of the Société d'Anthropologie.

In addition to the history of France, the study of anthropology for the whole world has been specially favored in Paris. For a purely biological side of the science, or that which relates to man's body simply, you must go to the Jardin des Plantes, where, under the regime of the venerable de Quatrefages and Professor Gaudry, you will be permitted to see an osteological collection set up with special reference to the archæology and natural history of man. After that you cannot omit the Musée Broca, in order to witness the active studies of Manouvrier and Chudzinski in osteometry, where the results of the great Broca's studies are preserved as a monument to his memory, and where the Société d'Anthropologie de Paris and the École d'Anthropologie are both conducted.

To complete the anthropologic circle, the Musée Trocadero is devoted to the arts of modern peoples, arranged geographically. It is to Paris what the Museum für Völkerkunde is to Berlin or the Royal Museum of Ethnology is to Copenhagen. Here we are under the guidance of Dr. E. T. Hamy, who is also the secretary general of the Congrès.

Not very far from the Trocadero is one of the most interesting collections in the world, called the Musée Guimet, after the illustrious citizen of the city of Lyons to whom it owes its existence.

This museum is devoted entirely to the history of religion, and so far pays most attention to the great religions of antiquity and to the modern Asiatic faiths. A separate home is set apart in the building for each religion. For instance, the religion of Egypt occupies a separate suite, the walls being covered with hieroglyphics. The columns and ceilings are copied from ancient temples of the Nile. Even the vitrines are faithful imitations in their legs and moldings of old furniture belonging to the Pharaohs. It is the same in the Buddhist and other rooms. The *genius loci* is the spirit of the religion illustrated. The city of Paris has furnished the ground and the French government has erected the building, the most perfect of its kind in the world, to honor the industry and learning of M. Guimet. To add perfection to this unique museum, two publications have been successfully conducted—Annales du Musée Guimet and Revue de l'Histoire des Religions.

To add completeness to this sketch of anthropology in the French metropolis a word should be said about the associations and publications devoted to our science. At present the Société d'Ethnographie and the Société d'Anthropologie are the active agents in the

study of the natural history of man, the latter being far in the lead. A very complete course of lectures has been organized and is annually conducted by the members of this society, and called the École d'Anthropologie.

The publications of greatest merit have been up to this time—

Bulletin de la Société d'Anthropologie de Paris.

Révue d'Anthropologie.

Révue d'Ethnographie.

Révue de l'Histoire des Religions.

Materiaux pour l'Histoire primitive et naturelle de l'Homme.

At the present moment some of these are in a state of fusion, and new ones devoted to demography and other social questions are to be founded. Indeed, further mention should be made of Archives de l'Anthropologie Criminelle et des Sciences Pénales, the publications of l'Institution Ethnographique, Bibliotheque des Sciences Contemporaines, Bibliotheque Anthropologique, Bulletin de la Société de Geographie, Dictionnaire des Sciences Anthropologiques, Gazette Archéologique, Journal Asiatique, Les littératures populaires de toutes les Nations, Mélusine, Révue de Mythologie, etc., Révue Archéologique, Révue de Linguistique.

It would not be proper to omit from this notice of special pleasures and advantages accorded to the anthropologists who visited Paris in August the delight which every one experienced in being able to look into the faces of distinguished men previously known only by correspondence and through their published works. Besides the French savants already named and many more, there were present from England, the Continent of Europe, and from the two Americas the best-known anthropologists. This pleasure was somewhat marred by the conspicuous absence of our German confreres, who had an excellent opportunity to show their magnanimity, and lost it. It is, therefore, with the greater satisfaction that the presence of Dr. Schliemann is mentioned and his part in the discussions noted.

But the crowning glory of anthropology was the French Exposition. Any one who visited that great spectacle became speedily convinced that the interests and studies of the anthropologists of Paris had not been confined to France. It was possible to see there twelve types of Africans, besides Javanese, Tonkinese, Chinese, Japanese, and other oriental peoples, living in native houses, wearing native costumes, eating native food, practicing native arts and rites on the Esplanade des Invalides side by side with the latest inventions and with the whole civilized world as spectators.

It was possible to commence near the base of the "Tour de trois cent metres" with models in actual size of rock shelters, igloos, wigwams, bark lodges, straw hovels, and, without leaving the grounds, to study every style of habitation in which human beings have ever lived or ruled or worshipped.

It was possible to trace the stream of inventions devoted to travel or transportation from snow-shoes, stilts, and other simple aids to locomotion through the domestication of animals, wheel carriages, navigation, steam-travel, electro-motion, and aeronautics.

Here in one building were groups of men and women, life size, illustrating the first French cave-dwellings, dressed in skin and working with paleolithic implements; the Cro-Magnon man and his wife carving an antler; ancient Mexicans manipulating agave fibre; the dolmen-builders at work on a model which is actually a cast of one of the most celebrated in Europe; a group of men working in flint quarries; the first smiths, in the persons of a group of Congo negroes, operating with stone tools and monkey-skin bellows; a group illustrating the Bronze Age, tent makers and dwellers, Chinese potters and cloisonné-workers, Assyrian sculptors surrounded by typical furniture and cuneiform inscriptions, Grecian potters producing the beautiful black and red ware often called Etruscan, Roman matrons spinning and weaving, and perhaps others.

This artistic grouping was intensified and vivified by the presence of men, women, and children in the several spaces devoted to foreign exhibits actually engaged in more species of hand-work than there is space here to enumerate. Add now to the rich collections of specimens, illustrations, and literature always accessible in Paris and to the exposition, in which greater attention was paid to anthropology than in any previous one, the presence of the congresses, and some appreciation of the activity and interest of the occasion may be attained.

In addition to the sessions of the French Association for the Advancement of Science, whose meetings and papers were supplemented by frequent visits to the Exposition, there were 120 Congresses in Paris during the months from May to October, inclusive. All of these had some reference to man and his works, and a few of them were purely anthropological, to wit:

June 24–29. Protection of Works of Art and of Monuments.

Aug. 4–11. Hygiene and Demography.

Aug. 5–11. Physiological Psychology.

Aug. 8–15. Association Française pour l'Advancement des Sciences.

Aug. 10–17. Anthropologie Criminelle.

Aug. 19–26. Anthropology and Prehistoric Archæology.

N. D. Sciences Ethnographiques.

N. D. Traditions Populaires.

All these were important occasions, for which the amplest provision had been made by enthusiastic specialists. In each of them the latest methods of research were earnestly discussed and not always with perfect unanimity. The future of each branch of inquiry was also a matter of constant study. The papers read were worthy of publication, only if all that was said and done in all the Congresses were published the world would scarcely contain the books.

The meeting for which the greatest preparations were made was the tenth reunion of the Congrès Internationäle d'Anthropologie et d'Archéologie Préhistoriques, the ninth session having been held in Lisbon, September, 1880. The sessions for the reading and discussion of papers were held in the assembly hall of the University.

The questions discussed in the Congress were the following:

1. Erosion and filling of valleys and filling of caverns, both in their relation to the antiquity of man.

2. Periodicity of glacial phenomena.

3. Arts and industries in the caverns and in the alluvium. Value of palæontological and archæological classifications applied to the quaternary epoch.

4. Chronological relations between the ages of stone, bronze, and iron.

5. Relations between the civilizations of Hallstadt and other stations in Daubes and those of Mycenæ, Tirhyns, Issarlik, and the Caucasus.

6. Critical examination of crania and other human bones alleged to have been found in the quaternary during the last fifteen years. Ethnic elements peculiar to the different ages of stone, bronze, and iron in Central and Western Europe.

7. Ethnographic survivals which throw light upon the social condition of primitive populations in Central and Western Europe.

8. How far do archæologic or ethnographic analogies authorize the hypothesis of prehistoric consanguinity or of migrations?

Under any circumstances the consideration of such important questions by so learned a body of specialists would have been worthy

of attention. But consider the auspices under which these meetings were held! The local committee of arrangements—including the, to us, well-known names of de Quatrefages, Bertrand, Hamy, Cartailhac, Chantre, Duval, Edwards, Faedherbe, Girard de Rialle, Hébert, Lagneau, Letourneau; Mortillet, Nadaillac, Pozzi, Reinach, and Topinard—left nothing to be desired.

If the anthropologists did not organize the great Exposition they at least furnished the presiding genius. Without doubt, of all expositions that have been held that of 1889 was most thoroughly anthropological. The members of the Congrès, both individually and collectively under excellent guidance, found the collections in the Palais des Arts Liberaux specially interesting.

The History of Industries, of which mention has been already made, was organized by Mm. Hamy, Cartailhac, Nadaillac, and Topinard, as well as the reconstructions of prehistoric and ancient life. Besides these, we were called upon to note M. Piette's collection from the grotto of Mas-d'Azil and the grotto d'Arudy; those of Mm. Massenat, de Lastic, Hardy, Paysant, Feaux, Maillard, Taté, Capitan, and others; others from the rude and the polished stone period made by Lecoq, Collin, and the Scientific Society of Archachon; dolmens explored by the Société Polymathique de Morbihan; illustrations of the age of bronze and of iron in France, Persia, Caucasus, and of the prehistoric archæology of Spain; collections from the stone age in French Africa, Cochin China, Japan, Oceanica; Scytho-Byzantine objects from the Caucasus; Mexican archæology; Gallo-Roman archæology, and, most attractive of all, the stone age of Denmark—an exhibit of which Dr. Müller and Dr. Schmidt were justly proud.

In this same Palais des Arts Liberaux there were ethnographic collections, such as those from Oceanica made by Bourdil, Foureau, Cunesset-Carnot, Collignon, Dort, Mougeot, Holbe, and Bourdil; others from Mozambique and Australia, and those of Prince Roland Bonaparte.

There was also a creditable display in anatomy, though it was very much crowded, to illustrate the comparative anatomy of man and the higher animals, the fossil men of France, and crania from various regions. The models and casts to show the latest studies in criminal anthropology were also much examined.

In the space allotted to the Missions Scientifiques in the same building were anthropological specimens from Greenland, Oronoco, and

other parts of South America, West Africa and the Canaries, Indo-China and Cambodia, Malaysia and Ceylon, and New Guinea.

Besides the anthropological exhibits in the Palais de l'Industrie, much material relating to our special subject was to be seen in the colonial and foreign pavilions. For example, Finland, Mexico, Ecuador, Nicaragua, Venezuela, Colombia, Hawaii, Portugal, New Guinea, Transvaal, Algeria, Tunis, Anam and Tonkin, French India, Tahiti and French Oceanica, New Caledonia, Mayotte, Guiana, Senegal, Gabon, Congo, Guadeloupe (Guesde), Cambodia, Cochin China, and Java.

A portion of the space near the Invalides was set apart for the exhibition of African and Franco-Indian natives at their characteristic occupations, chief among the popular attractions of which were the Javanese theatre and the Annamite Buddhist temple. The members of the Congrès, guided by the local committee, spent many hours in these savage enclosures and houses studying the people and their arts and listening to their rude music.

Under such favorable auspices met the Ninth Congress of Anthropology and Prehistoric Archæology. It will be long before such wonderful advantages are again brought together for studying the natural history of man.

The previous congresses have been as follows:

Congrès internationale d'Anthropologie et d'Archeologic prehistorique, founded in Spezzia in 1865.

Congrès:

1. Neufchatel, 1866. Compte rendu, 8vo; Paris, 1866.
2. Paris, 1867. Compte rendu, 8vo; Paris, 1868.
3. Norwich, 1868. Compte rendu, 8vo; London, 1869.
4. Copenhagen, 1869. Compte rendu, 8vo; Copenhagen, 1870.
5. Bologna, 1871. Compte rendu, 8vo; Bologna, 1873.
6. Bruxelles, 1872. Compte rendu, 8vo; Bruxelles, 1873.
7. Stockholm, 1874. Compte rendu, 8vo; Chalons, 1875.
8. Buda.Pesth, 1876. Compte rendu, 2 vols., 8vo; Buda-Pesth, 1887.
9. Lisbon, 1880.
10. Paris, 1889.

So marked was the success of the Paris Exposition in regard to to its anthropologic results that it would seem to be most fitting to

invite our foreign associates to meet us in 1892 at our own exposition on American soil, where occur so many problems of interest to the whole anthropologic world.

THE ETHNOLOGIC AFFINITIES OF THE ANCIENT ETRUSCANS.—Starting out with the assumption that the ethnologic position of the ancient Etruscans is yet unsolved, Dr. Brinton contributes an important paper to the subject which is now reprinted from the Proc. Am. Philos. Soc., Vol. XXVI, Oct. 25, 1889. The author compares the geographical position of the ancient Etruscans in Italy, their physical traits, culture, and above all such remains of their language as have been rescued from inscriptions of monuments and the few words handed down by the classical writers with the like features of the Kabyles of Algiers, and with their parent stem the ancient Libyans, and advances cogent reasons for considering that all are genetically related. His conclusions are categorically stated as follows:

1. The uniform testimony of the ancient writers and of their own traditions asserts that the Etruscans came across the sea from the south and established their first settlement on Italian soil near Tarquinii; this historic testimony is corroborated by the preponderance of archæologic evidence as yet brought forward.

2. Physically the Etruscans were a people of lofty stature, of the blonde type, with dolichocephalic heads. In these traits they corresponded precisely with the blonde type of the ancient Libyans, represented by the modern Berbers and the Guanches, the only blonde people to the south.

3. In the position assigned to woman and in the system of federal government the Etruscans were totally different from the Greeks, Orientals, and Turanians; but were in entire accord with the Libyans.

4. The phonetics, grammatical plan, vocabulary, numerals, and proper names of the Etruscan tongue present many and close analogies with the Libyan dialects, ancient and modern.

5. Linguistic science, therefore, concurs with tradition, archæology, sociologic traits, and anthropologic evidence in assigning a genetic relationship of the Etruscans to the Libyan family.

H. W. HENSHAW.

NOTES ON COUNTING AND MEASURING AMONG THE ESKIMO OF POINT BARROW.*

BY JOHN MURDOCH.

From September, 1881, to August, 1883, the writer was stationed in the immediate neighborhood of the large Eskimo villages at Cape Smyth and Point Barrow, Arctic Alaska, as a member of the International Polar Expedition, and had the good fortune to become intimately acquainted with a large number of their interesting inhabitants.

These Eskimo have had comparatively little intercourse with civilized men, as it is only within the last thirty-five years, or since the time when H. M. S. "Plover" passed two winters at Point Barrow as a depot ship, during the great Franklin search expeditions, that the American whalemen have resorted to that region. Before the time of the Franklin search they had seen white men upon only two occasions, namely, when Elson, in the "Blossom's" barge, discovered and named Point Barrow, in 1826, and when Thomas Simpson, coming from the Mackenzie river, reached the same point in 1837.

Consequently they were but little changed from their primitive condition of culture, and retained their language almost in its original purity. In the process of collecting linguistic material among them, some interesting points were discovered in regard to their methods of counting and measuring, and these have been brought together in the present paper.

The language spoken at Point Barrow is sufficiently like that of the Greenlanders and other eastern Eskimo to be readily understood by them. This fact has been already pointed out by various writers. So far as I have been able to ascertain, the chief phonetic difference between the two dialects, apart from the fact that the vowel sounds are frequently different in words otherwise identical, appears to be that a surd consonant in Greenlandic, especially at the end of the word, is represented by the cognate nasal at Point Barrow, and that the so-called "fricative lingual" *ss* (pronounced *sh* or like the

* Read before the Society, December 4, 1888.

French *j*) of the Greenlandic becomes a true rolled *r*. Bearing these phonetic changes in mind, the resemblance of the Point Barrow system of numeration to that of the other dialects is very striking.

It was not easy to obtain any accurate information about the numeral system of these people, since in ordinary conversation they are not in the habit of specifying any numbers above five. Six and all higher numbers are ordinarily spoken of as amadráktûk—"many." The same has been noticed among other Eskimo. For example, Captain Parry speaks of "the imperfect arithmetic of these people (the natives of Fury and Hecla Straits), which resolves every number above ten into one comprehensive word" (Second Voyage, p. 549).

They have, however, a series of numerals running at least as high as one hundred, most of which seem to be but rarely used. This agrees with the observations of Pastor Brodbeck among the East Greenlanders in 1882—"Zählen können die heidnischen Grönländer nur mangelhaft, über 20 hinaus versteigen sie nicht gern" (Nach Osten, p. 42). Those most frequently used are the words for ten, fifteen, and twenty. We did not succeed in collecting many of the other high numerals, and many of them appear to be somewhat cumbrous periphrases, which might be invented on the spur of the moment for expressing quantities which were appreciated, but for which there existed no single definite word.

The first five of the numerals and the word for ten are essentially the same as what are called the "real numerals" in the Greenland dialect, and the remainder appear to be made by repeating these numerals in connection with "part-words" (theilwörter), which indicate on which hand or foot the counting is done (see Kleinschmidt, Groenlandische Grammatik, § 42, p. 37). Together they form the series of cardinal numerals, which, as far as we could learn, are used only in concrete numbers, in the sense of numeral adjectives. The "real numerals" are:

1.	Ata′uzik,	corresponding to Greenlandic	atausek.
2.	Ma′dro,	" "	mardluk.
3.	Pī′ñasun,	" "	pingasut.
4.	Si′saman,	" "	sisamat.
5.	Tû′dlemût,	" "	tatdlimat
10.	Kodlin,	" "	kulit.

The "part-words" were not obtained very accurately, and are used in a somewhat different way from the Greenland method. Akbĭnĭgĭn, or akbinĭdĭgĭn, appears to be a form of arfinek "on the second hand," but seems to have a more generalized meaning—*i. e.*, "on the next hand or foot." Six is therefore expressed in full "atautyimĭñ akbınĭgĭn tudlimû(t)," "five (and) once on the next" (or if tûdlimût is derived, as has been suggested, from talek, the arm, "one hand and once on the next"), or "atautyĭmĭñ akbĭ'nĭgĭn," or simply "akbĭ'nĭgĭn," when a Greenlander would say "arfinek-atausek, once on the next hand." In the same manner seven is "twice on the next," "madro'nĭñ akbĭ'nĭgĭn," and eight "three times on the next," "pĭñas'unĭñ akbĭ'nĭgĭn." Nine, however, is formed differently, being kodlĭnotai'la, which appears to mean "that which has not its ten." Ten, kod'lĭn (kulit) is supposed to be derived from kut or kule, "the upper part," referring to the number of digits on the hands of a man.

The intermediate phrases "one on the first foot," &c., for eleven, twelve, and so on, were never heard, but instead of "five on the foot" for fifteen (made in Greenlandic with the "part-word" *arkanek* or *isigkane*) we found what appears to be a "real numeral" *akimi'a*, not occurring in the other dialects. From this word is sometimes made a word for fourteen, akimiaxotaityuña, "I have not fifteen." Twenty, inyuĭ'na means "a man completed" (from i'nu [G. inuk] a man, and inârpâ to complete it), meaning that in counting twenty we use all the fingers and toes of one man. The expression in Greenland is slightly different from this, being inuk nâvdlugo, "a man come to an end." Twenty-five and thirty are "inyuĭ'na tûdlimûnĭñ akbĭnĭ'dĭgĭn," "twenty and five times on the the next," and "inyui'na kodliniñ akbĭnĭ'dĭgĭn," twenty (and) ten times," &c. Thirty-five is "ĭnyuĭ'na akĭm'iamiñ aipâliñ," "twenty accompanied by one fifteen times." Forty is "two twenties," madro inyuĭ'na or "madrolipi'a." The last part of the latter word appears again in tû'dlimûbipi'a, one hundred, and perhaps is another phrase for "twenty." In the word for 100 the first part is the "subjective" or possessive form of tû'dlimût, five. The expressions in Greenlandic and other Eskimo dialects for these higher numbers are very different, which is pretty strong evidence that they have been developed since the separation of the Eskimo into their different branches. For example, in Greenlandic twenty-five is

inûp aipagsâne tatdlimat, "five on the second man," and thirty is "ten on the second man," "*inûp aipagssane kulit.*" In the Mackenzie dialect these two numbers are respectively *iglut tallematoρk* and *innok kpolinik-tchikpalik.*

On the other hand, the "real numerals" are wonderfully alike in all the vocabularies that have been collected, showing that before their separation the Eskimo were in the habit of reckoning at least to five.

It is evident from the cumbrous forms of the higher numerals that any arithmetical processes are difficult if not impossible. Mr. Richard Cull, in an article describing three Eskimo brought to England from Cumberland Gulf, in 1854 (published in the Journal of the Ethnological Society of London, v. 5, 1856, pp. 215–225), goes to work quite elaborately to use the numerals he learned from them in various arithmetical processes. He shows that addition and subtraction, and even multiplication and division, can be performed with these numerals, but the processes are exceedingly cumbersome, and, so far as I can learn, entirely foreign to Eskimo modes of thought.

The Point Barrow natives, however, appear capable of a sort of crude addition, since in counting objects they divide them into groups of five and obtain the sum total from the number of these groups. In counting up to five, the ordinal numerals are used, as in the other dialects. With the exception of *ai'pa,* "second," which, as in Greenlandic, means "his companion" (viz., the companion of the first), these are the cardinal numbers with the "suffix" of the third person, which indicates that the word to which it is applied belongs to something else. Kleinschmidt's explanation of this usage is that each ordinal is supposed to be the property of the preceding. For instance, third is "[the two] its third," fourth is "[the three] their fourth," and so on. "First," then, in the Point Barrow dialect, must mean "their first," referring to those that follow. In Greenlandic and other dialects a different word is used for first, namely, *sujugdlek* (with its dialectic variants), "the foremost." This word is not easily recognized in the form in which it is found at Point Barrow, *sibwudli,* where we only heard it used as the name of the star Arcturus, but the form of the word, *tçivulepk* [*tsivulek*], in the Mackenzie River dialect, connects the two widely distant forms.

The ordinals at Point Barrow are as follows:

Atau'zia, first.

Ai'pa, second (Gr., aipâ).

Piñayua, third (pingajuat).

Si'sama, fourth (sisamât).

Tûdlima, fifth (tatdlimât).

The question "How many?" is frequently asked in the form "How many times?" [sc. is the object repeated], using the *Modalis* "kapsi'niñ." The numeral in the answer is then in the same case, "atau'tyimiñ," "madro'niñ," &c.

Methods of measuring space appear to be in the most primitive state. Our vocabulary contains no words indicating any standard of length or of size, and there appear to be none in use among other Eskimo. Of late years, however, in their dealings with the whites the Point Barrow people have learned to measure calico, drilling, &c., by the fathom—that is, the length from tip to tip of the outstretched arms.

Time is measured by the sun when it is visible, or by some of the stars at night. For instance, they say "We started when the sun was yonder (in the heavens) and travelled till it was yonder." Arcturus, Sibwu'dli, is the time-piece of the seal-netters. When this star has passed over to the east they know that dawn is at hand and that netting is nearly over.

The length of a journey is reckoned by the number of "sleeps" (compare Parry, 2d Voyage, p. 556), and time is sometimes reckoned by the moon. For instance, they told us that "when this moon is gone and the next moon is little the whales will come."

We learned three names for seasons of the year—u'kio, winter, and u'piña and upiñaksa, warm weather. These words correspond to the Greenlandic upernâk, spring, and upernagssak, early spring.

Dr. John Simpson, R. N., who was the surgeon of the depot ship "Plover," and who published a very accurate sketch of the Eskimo of Point Barrow ("Observations on the Western Eskimo and the Country They Inhabit," originally printed as an appendix to the report of the commander of the "Plover" in the Parliamentary Reports for 1855, and reprinted in "A Selection of Papers on Arctic Geography and Ethnology," prepared by the Royal Geographical Society for the English Arctic Expedition in 1875, pp. 233–275), states that the year is divided into four seasons, and the names we

obtained correspond to those he gives for "late winter" and "early summer," or spring and summer.

We obtained with some difficulty the names of nine moons or lunar months of the year, but were told that for the rest of the year "there was no moon, only the sun." Dr. Simpson, however, obtained names for all twelve moons. The names of these moons were given differently by different informants, and do not wholly agree with those given by Simpson. It is quite likely that they are not invariable, and may be going out of general use. They begin to reckon the months from the time when the women begin sewing upon deer-skins, in the autumn, according to Simpson, starting with the first new moon after Elson Bay freezes over. They are as follows:

1. Su'dlivwiñ (Shud'-le-wing, Simpson), "the time for working—*i. e.*, sewing."

2. Su'dlivwiñ ai'pa (shudlewing aipa), "the second time for sewing," or su'dlivwiñ kiñu'lia, "the succeeding sewing-time."

3. Kaibwid-wi (Kai-wig'-win), roughly speaking, December, the time of the great dances. Dr. Simpson's form of this name, which he translates "rejoicing," appears to be more correct than the one obtained by us, since "kaiwi'gwiñ" (from Gr. kâvigpok) would mean "the time for going round in a circle" (as in the dance). The name probably should be translated "the time for dancing."

4. Ida'sugaru (Ir-ra-shu'-ga-run, "great cold") is the dark mid-winter moon, at the end of which the sun comes back—about January 23. The name appears to be derived from G. issik, cold; but I have been unable to analyze the compound. It is also called sûkûnyatyia (sha-ke-nát-si-a), "little sun," and sûkûnyasúgaru.

5. Audláktovwiñ (au-lak'-to-win), "the time for starting out" (to the deer-hunt), from audlákto, to start. I am confident that Simpson was wrong in placing this moon before the preceding, as the deer-hunting parties certainly do not start till the February moon after the sun has returned.

6. Sûksilábwi (e-sek-si-la'-wing), the next moon (March). This word, of which Doctor Simpson's form appears to be more correct than ours, seems to mean "the time for starting to come home."

7. Umísûrbwiñ (kat-tet-á-wak, returning for whales), "the time for making ready the boats" (April).

8. Kaúkerbwiñ (ka-wait-piv'-i-en, birds arrive) (May) appears to mean "the time for fowling," from an apparent variant of kaúwe, fowl.

9. Yögniabwiñ (ka-wai-niv'-i-en, birds hatched), the time for bringing forth—*i. e.*, laying eggs" (June).

As already stated, we learned no names for the other three moons.

They have definite words for to-day, and several preceding and following days. "To-day" is *kûñmû'mi* (there are other expressions, but this was the one commonly used in their intercourse with us). This word, which is evidently in what Kleinschmidt calls the *localis* case, does not appear in Greenlandic, where the expression used is *uvdlume*, "in the [present] day." "To-morrow" is *ublaxo* or, perhaps more properly, *ublákun* (literally, "in the morning," a curious coincidence with the German "*morgen*"), and "yesterday," *unúñmûn* (literally, "when it was evening"). "Day before yesterday" and "day after to-morrow" are both called by the same name, *ĭkpû'ksa* (which is the same as the Greenlandic *igpagssak*, "yesterday"), and the third day from the present either way, with all preceding or following days for a short period, are called *isfa*. This is the same as the Greenlandic *ivsak*, "some days ago." For long periods in the past (we were given to understand more than four years ago) they say *aipáni* (literally, "in the other [sc. time]"). For very ancient times, beyond the memory of living man, they say *adráni*. Future time was generally referred to as *nanáko*, *nanákun*, "by-and-by," or when some expected event, like the going of the ice or the coming of the ships, should happen.

It will be seen that the expressions which they use for past time are too vague to render it possible to learn the date of any event in their history or traditions, unless it can be referred to the time of the Plover's visit, beyond which we have no well-defined date with which they are acquainted.

THE ABORIGINAL BARK-PEELER.—In several archæological museums of Europe, notably in the Royal Museum, in Copenhagen, implements of bone are to be seen, often made of a rib, whose function has not been known. The implement referred to is sharpened to a wedge-shaped edge at the lower extremity, the body is slightly bent along its entire length, and the upper end is rounded for a handle.

Implements of precisely similar form are now in use by the Indians of the Pacific coast of America, from Oregon to Alaska, for peeling bark from the cedar trees. Doubtless similar tools were formerly in

use in the birch-bark country and in South and Central America, where a kind of rude tapa cloth was beaten from the bark of the lace-bark tree (*Lagetta lintearia*).

One specimen from the Tulalip Agency, in Washington Territory, is made of elk antler, sixteen inches long and sharpened at either end. The Indians of Queen Charlotte Islands and the adjoining mainland employ a great many smaller peelers to take off large slabs of bark in an unbroken condition for the roofs of their houses. These implements are less than a foot long and are made of the ribs of the deer.

The process of bark-peeling is a very ingenious one. A tree is hacked around quite through the bark in furrows about four feet apart. A vertical slit is also made. Then, by means of a series of the peelers, the bark is lifted from the tree and kept in flat form by a series of plugs and props until it dries. It remains flat after drying and is cut into sections suitable for shingles. For taking off the bark to be made into cords, baskets, cinctures, etc., the same amount of shaping is not necessary, but the peeler is universally used in separating the bark. The birch-bark canoe was formerly employed along our northern boundary wherever the birch tree was abundant, and it would be well to study the method of separating the bark from the trees.

O. T. MASON.

A VERY ANCIENT TOMAHAWK.—It is generally known that the iron tomahawk with a pipe on the blunt end is an invention of the white man, and counts for nothing in the study of primitive industries. In the ethnographic collection in Copenhagen is an antique-looking specimen with a blade of stone, resembling a diminutive specimen of our common two-ended pick, or more precisely, like one of those blades that are fitted into a socket on the handle and have no eyelet. The stone blade in question is lashed to a worm-eaten handle by means of rawhide just like an Eskimo pick. In the collection of the National Museum are two such blades without handles, both from New York. These furnish good evidence that the Copenhagen Museum specimen is an aboriginal tomahawk of the New York Indians, made before the iron ones were adopted. So far as we know it is the only perfect specimen in the world.

O. T. MASON.

A NEW LINGUISTIC FAMILY IN CALIFORNIA.

BY H. W. HENSHAW.

In delving among the rarer books and manuscripts which relate to the early history of America, the student not unfrequently comes across mention of tribes which have vanished and have left their names as the sole record of their existence. They died and left no monuments. Yet the researches of the archæologist may bring to light the stone implements such peoples made and used, and thus, to a limited degree, we may obtain glimpses of the culture state they lived in and form some idea of their mode of life.

Substantial as are such archæologic clews and important links as they are in reconstructing the past life of their former owners, they are by no means the most important of the heir-looms which research occasionally places in the hands of the student, since they throw little or no light upon the relationship of their owners and but dimly pierce the obscurity of their past history. Evidence of a much more satisfactory sort occasionally awaits the search of the linguistic student, when in turning the forgotten pages of history he finds vocabularies of the speech of vanished races, and is thus let in, as it were, to their inner selves, obtaining glimpses of their daily thought and religious ideas, and receiving hints of their relationship to other and it may be to living tribes. The latter may to some extent repeat their habits and peculiarities, and perhaps may furnish suggestions of their origin, migrations, etc. How clear an insight into such matters may be afforded by a study of the language of a people and how minute the details gathered by the linguistic student is to be seen by the remarkable results obtained by students of the Aryan languages, who are able to present a panorama of the daily life and thought of the old Aryans almost as though they had witnessed what they describe.

It is the purpose of the present paper to call attention to one of these vanished peoples, not because the facts to be given concerning it are either many or satisfactory, but with the primary purpose of recording such facts as are known, few and unsatisfactory though they be, and more important still of directing the attention of

students to the importance of searching for similar cases. In the present instance, indeed, even more may be hoped; for, while the people in question has been lost sight of for a hundred years or more, it is possible that a few survivors yet remain, and it is to be hoped that this fact once known the zeal of investigators may be stimulated and new and richer gleanings be added to the small store already harvested.

The people I refer to are a tribe known by the name Esselen or Ecclemachs, and formerly lived in California, to the east and south of the Monterey Bay, and with other neighboring tribes were gathered into the San Carlos Mission of Monterey, in 1770.

The first clew to the existence of a group of California Indians different from any recognized by recent students was obtained by Mr. Curtin, of the Bureau of Ethnology, from the rare collection of newspaper articles by Alexander Taylor. Though not a learned man, Taylor was an indefatigable student and reader, as well as an assiduous collector of Indian lore. Between the years 1860 to 1863 he published in the California Farmer, a weekly paper, all the material bearing upon California Indians he himself was able to gather and, as well, copious notes and extracts from the Mission records and from such of the early writers as he had access to. The result is a mass of material badly arranged, or, more properly, not arranged at all, illy digested and not always wisely selected, but still forming a contribution to the subject neither to be despised nor to be overlooked by the student of to-day. This author copies two vocabularies, one from Galiano, the other from La Perouse, and a comparison of the 39 words they contain seemed to show that here was an absolutely distinct linguistic family which had been entirely overlooked. The early date at which these vocabularies were taken, 1786 and 1792, and the fact that the Indians appear not to have been seen by any subsequent investigator, seemed to negative the hope that any of them might still survive. The doubt of there being any survivors seemed to be strengthened by the fact that Taylor visited Monterey in 1856 and took a vocabulary of the supposed "Eselenes," which, however, unfortunately turns out to represent the neighboring Rumsien language of which there are a number of good vocabularies extant. As the writer was about to visit the west coast for the purpose of linguistic investigations, the rediscovery of the lost Esselen tribe was made a prime object of the trip. For this, as well as for other linguistic purposes, an exhaustive search was made

through the counties of Marin and Monterey, to the north and south of San Francisco. While some very interesting linguistic results were obtained, some time passed before any clew to the Esselen people was secured.

It is a melancholy fact that in middle California the Indians have almost wholly disappeared. Here and there upon the outskirts of some town or in the nooks of some remote cañon of the foothills is still left an occasional Indian, man or woman, more rarely a family, whose identity, however, is so swallowed up by the prevailing Mexican type that one may spend days in a town inquiring for Indians without finding a person who chances to be acquainted with an aborigine. There are many Mexicans in middle and southern California who socially and physically are not a whit superior to the Indian, and in the motley throng the occasional Indian passes unnoticed except by the few. Their identity is the more readily lost because all of them, without exception, speak the Mexican dialect of Spanish, and never by any chance let fall in public a word of their own language; and indeed why should they? They are now so few in number that the old people rarely have a chance to converse together in their native tongue, while the young, who are mostly half-breeds, associate chiefly with the Mexicans and never learn the language of their fathers. Indeed it is a fact that in a number of instances the children of Indian women heard their mother's language for the first time when she repeated words and phrases to me for the purpose of notation.

Failing to discover anyone in San Francisco who knew of the whereabouts of Indians in either counties above mentioned, I set out for the vicinity of San Rafael Mission, 75 miles to the north. Knowing how tenaciously the Indians cling to the neighborhood of their former home, I selected this as the most likely spot to find any survivors. Not a single Indian, however, lives in or near the town, nor could I learn of any in the neighboring towns; when finally I heard of the existence of a few it was on the coast to the north, near the entrance of Tomales Bay. Here I found several men and two women, from one of whom I obtained an excellent vocabulary of the dialect spoken at the Mission. With this I was obliged to rest content, as none of the Indians on the Bay knew of others or were aware of the existence of any dialect but the one I obtained. The interest attaching to the language of this locality is due to the fact that its relationship has been the subject of discussion. By some

scholars it has been assumed that one linguistic family occupied the peninsula north of San Francisco Bay and the whole country coastwise for a considerable distance south and as far east as the headwaters of the Moquelumne, Calaveras, Tuolumne, Merced, and others. A comparison of vocabularies, now in possession of the Bureau, by Mr. Curtin and myself, however, had raised doubts as to the correctness of this conclusion. As the result of a study of the vocabularly obtained at Tomales Bay with the others from this region in possession of the Bureau, and those subsequently obtained at the south, I am now convinced that the area in question was formerly occupied by two entirely distinct families.

Subsequently I journeyed to the southward and visited Santa Cruz, where formerly was another old mission. Upon the outskirts of this town and almost in the shadow of the church—the officiating priest of which told me there were absolutely no Indians in the neighborhood—I found a little colony of Indians and half-breeds who had a respectable knowledge of the dialects formerly spoken by the Indians of the locality. To every Indian I met I repeated word for word the Esselen vocabularies of Galiano and Lamanon, but none of them recognized the words as of a language they ever heard spoken. Disappointed, though by no means disheartened, I turned to Monterey as the Mecca of my hopes, as there I expected to find a considerable number of the once numerous old Mission Indians still clinging to the land formerly filled by their fathers. On the contrary, nearly all the Indians have disappeared and a number of days passed before I found myself face to face with an aborigine; at the present time there are probably not more than half a dozen pure bloods found anywhere in this locality. One of the number, an old woman of perhaps 65, proved an honest and willing subject and she herself volunteered the information I had so long sought. While mentioning the names of the rancherias formerly about the mission, she spoke of the Esselen tribe as a people who lived to the east and south of the Bay and whose language differed entirely from her own, the Rumsien. In reply to my eager request to speak a word or two of the language she said that if I would give her time to think she was certain of her ability to do so, as in early life she had mingled much with the tribe, her father having married an Esselen women. Believing I had found the long-desired clew I repeated the Esselen numerals as given by Galiano and she at once recognized the words for one and three. As the result of much hard thinking for several

days, she succeeded, with the help of a second old woman, in recalling over 100 words and some 50 short phrases of the language—a priceless boon to the linguistic student. Though their study is not yet completed they have served to dispel any doubt as to the distinctness of the stock they represent.

Guided by the directions of old Eulalia, I subsequently visited the Salinas Valley to the south, in search of two women who had married Mexicans and who she said were of Esselen blood. The marriage of Mexicans with Indians is usually a very informal sort of marriage, and the tie is usually dissolved on short notice at the option of one or both parties. Accordingly my endeavor to discover these women by hunting up their respective husbands proved a wild-goose chase indeed. The Mexican husband was not hard to find, and from him I could always learn the name and whereabouts of his successor, only to discover that the wife had migrated to another settlement or taken up her abode in some distant cañon. After much search I found both women, but alas for my hopes, neither remembered a word of their own language. At least so they said and I was compelled reluctantly to believe them. Both claimed to have lived with the Rumsien tribe so long as to have forgotten their own tongue.

However, my search was not entirely unrewarded, for living in the same house with one of them was an aged and blind Indian who also spoke the Rumsien tongue, but who recalled a few words of Esselen and who verified quite a number of those given me by the Monterey woman. In addition he gave some valuable facts as to the habitat of the tribe. He also told me that five years before an Esselen man lived near the adjoining town of Cayucas who really spoke the language, not merely a few words of it, but a sufficient number to converse. He was the last one who did so, so far as he knew. This Esselen went south towards Santa Barbara and had not been heard of since. As I myself was in Santa Barbara in 1884 and made most careful inquiry as to all the Indians of that vicinity—and there are very few of them—it is only too probable that this, the last survivor of the Esselen people who spoke his own language has gone the way of the rest. As the result, therefore, of my investigations I was able to collect 110 words and 68 phrases and sentences of this almost extinct language. Singularly enough these were obtained from the lips of an alien people—a sad commentary upon the fate that has overtaken some of the American tribes.

OMAHA RELIGIOUS PRACTICES.—At the meeting of the Society November 5, 1889, Mr. J. Owen Dorsey read an important paper on the above subject.

Mr. Dorsey began with an account of the Omaha invocation to the sun, and gave a free translation of the usual formula employed. Next came a description of trapping practices. Tobacco was presented and prayers were made to the game, trap, medicine or charm, pack-strap, chief tent-pole, etc., each object thus addressed being personified.

The Omahas believed in different gods or mysterious powers before they learned of our Supreme God, the God of monotheism. This is in accord with some of the statements of the late S. R. Riggs concerning the Dakotas, and it agrees with what Mr. Dorsey had learned from the Ponkas in 1872–'73.

The concluding part of the paper treated of personal mystery decorations, and was illustrated by original sketches painted by an Omaha. Some of these decorations were worn on garments, others appeared on tents. The use of such decorations was restricted to members of the different orders of shamans.

This paper will be published in full in the 8th Annual Report of the Bureau of Ethnology.

H. W. HENSHAW.

ESKIMO OR INDIAN?—At the meeting of the Swedish Anthropological and Geographical Society on October 10, 1888, a paper was read by E. Dahlgren on recent investigations in regard to the voyages of the old Norsemen to Vinland. The paper was chiefly a resumé of Professor Storm's "Studier over Vinlandsreiserne, Vinlands Geografi og Ethnografi."

To Professor Storm's opinion, quoted by the speaker, that the "Skrälings" met by the Norsemen in America were not Eskimo but Indians (Micmacs and Beothuks), Baron Nordenskiöld replied that he was convinced from his personal acquaintance with Eskimo, as well as from a comprehensive study of the older Arctic literature, that the "Skrälings" could be nothing but Eskimo. (*Ymer*, v. 18, pp. xvii–xix.)

JOHN MURDOCH.

THE THUNDER-BIRD AMONGST THE ALGONKINS.

BY A. F. CHAMBERLAIN.

The interesting article of Rev. Myron Eels in Vol. ii, pp. 329–336, has suggested a brief discussion of the same subject with regard to the tribes of Algonkian stock amongst which the belief in the thunder-bird appears to be very wide-spread. It is found with the Crees of the Canadian Northwest and amongst some of the tribes of Micmac lineage dwelling near the coast of the Atlantic, on the shores of Hudson's Bay, and in the States on the southern banks of Lake Superior. The investigation of this peculiar belief must therefore cover the whole Algonkian region.

The Crees believe that certain divine birds cause the lightning by the flashings of their eyes, and with their wings make the noise of thunder. The thunderbolts are the "invisible and flaming arrows shot by these birds." Hind[2] speaks of the Plain Indians of the Northwest as "anxious and timid during the roll of thunder, invoking the Great Bird by whose flapping wings they suppose it to be produced, or crouching from the blink of his all-penetrating eye, which they allege is the lightning's flash." Cognate is the belief of the Blackfeet that winds are caused by the flapping of the wings of a great bird in the mountains.[3]

Among the Algonkian tribes of the Lake Superior region the same, or similar, beliefs are current. Rev. John McLean[4] informs us that the Pottowattamies look on one of the high mountain peaks at Thunder Bay as the abode of the thunder, and that at one time a nest containing the young thunder-birds was there discovered by them.

From Rev. E. F. Wilson[5] we learn that the Ottawas believed the thunder was "a great bird which flapped its wings on high over the

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[1] Lacombe, Dict. de la Langue des Cris (1874), pp. 575, 262. The thunder-bird is called *piyesis—i. e.*, "bird"—identical with Ojebway *bînêsi*, Mississagua *pinesi*, Illinois *pineusen*, Ottawa *pinàsi*, evidently a common Algonkian word for "bird."

[2] Narrative of Canad. Explor. Exped. of 1857, etc. (1860), ii, p. 144.

[3] McLean. The Indians, their Manners and Customs (1889), p. 38.

[4] Op. cit., p. 182.

[5] Our Forest Children. N. S. No. 1 (July, 1889), p. 5.

earth to guard its inhabitants and to prevent those evil monsters hidden in the bowels of the earth from coming forth to injure them."

The existence of the thunder-bird tradition among the Ojebways of the northern shore of Lake Superior has been confirmed to the writer by information from Rev. Allen Salt, a Mississagua Indian, who has frequently visited that region. Regarding the Ojebways (Chippeways), Rev. Peter Jones[1] says "they consider the thunder to be a god in the shape of a great eagle that feeds upon serpents, which it takes from under the earth." Jones also relates (Op. cit., p. 86) the story of an Indian who visited the nest of a thunder-bird on a high mountain. He saw bones of serpents scattered about, and noticed that "the bark of the young trees had been peeled off by the young thunders trying their arrows before going abroad to hunt serpents." At another time a party of Indians found a nest on the plains and put the young thunder-birds to death, after blinding them with their arrows (which, however, were shattered to pieces). All but one of the Indians were killed by the old birds on their return. The Ojebways believed that the home of the thunder-bird was on the top of a high mountain in the West, where it lays its eggs and hatches its young like an eagle. From time to time it sets forth into different parts of the earth to search for serpents, which form its food. When they saw a thunderbolt strike a tree these Indians believed that the thunder "had shot its fiery arrows at a serpent and caught it up in the twinkling of an eye." This belief is confirmed by the evidence of the early Jesuit missionary, Père Buteux[2], who relates it in very similar terms of the Algonkins of the north shore of the St. Lawrence in 1637. The thunder-bird is also known to the Ojebways of Red Lake, Minnesota, and figures in their pictographic records.[3]

While on a visit to the Mississaguas of Scugog, Ontario, in August, 1888, the writer was told by an aged woman of that tribe the following as the ancient belief of her people: "The thunder was caused by the flapping of the wings of the great thunder-bird that lived up in the sky, and the lightning was caused by the flashings of its eyes." A great storm of thunder and lightning was explained thus: "The young birds up there in the sky, they are so glad, they fly all about and make a great deal of thunder and lightning; like all young people, they are very restless." Not far from the village

[1] History of the Ojebway Indians (1861), p. 85.

[2] Relations des Jésuites, Année 1637, p. 53. See also Brinton, Myths of the New World (1876), p. 118.

[3] Dr. W. J. Hoffmann, Amer. Anthropologist, i, 225.

of Scugog is buried a Mississagua chief, who just before he died called out that "I die! the thunders are coming!"

Amongst the Mississaguas and Ojebways, Indians were very often named after the "thunders." At Scugog one of the sons of Nāwīgishkōkē (sun in the center of the sky) was named Head Thunder, while another Indian was called Osāwānimīkī (Yellow Thunder). When the Rev. Peter Jones was named, the appellation conferred upon him was *Kākīwākwōnābi* (sacred waving-feathers), and his tutelary deity was the thunder. "He was given a war-club and a bunch of eagle-feathers, symbolical of the might and swiftness of the eagle-god of thunder."[1]

Among the Passamaquoddy Indians the thunder-birds appear as men. Leland[2] has recorded a legend of this tribe of a man who was whirled up into the abode of the thunders and who told what he had there seen. The "thunders" were very like human beings, used bows and arrows, and had wings which could be removed or put on as occasion demanded. "The thunder is the sound of the wings of the men who fly above. The lightning we see is the fire and smoke of their pipes." These thunder-beings are always "trying to kill a big bird in the south." Here a recollection of the thunder-bird of other Algonkian people would seem to be present. Other "thunder stories" are given by Leland. According to another[3] legend, the giant thunder-spirits, with eyebrows of stone and cheeks like rocks, dwell in Mount Katahdin. According to another Passamaquoddy legend,[4] *Badawk*, the thunder, and *Psawk-tankapic*, the lightning, are brother and sister, whilst the distant rumbling before the thunder-crash is made by the child of *Badawk*, to whom his grandfather had fastened wings. This child was the offspring of *Badawk* and an Indian woman.

The Passamaquoddies also believe that the wind is caused by the motions of the wings of "a great bird called by them *Wochowsen* or *Wuchowsen*, meaning Wind-Blow or the Wind-Blower, who lives far to the north and sits upon a great rock at the end of the sky."[5] This resembles the belief of the Blackfeet, noticed above.

Leland thinks[6] that this "Wind-Blower is, as he appears in the Passamaquoddy tale, far more like the same bird of the Norsemen

[1] Journ. of Amer. Folk-lore, i, 152.

[2] Leland. Algonquin Legends of New England (1885), pp. 263–266.

[3] Op. cit., p. 261. [4] Op. cit., p. 267. [5] Op. cit., p. 111.

[6] Op. cit., p. 113. A similar account of Passamaquoddy beliefs is given in Journ. of Amer. Folk-Lore, ii, 230.

than the grotesque thunder-bird of the Western tribes." He seems inclined to explain many of the incidents in the "thunder stories" from Eskimo and from Norse mythology.

It may be, however, that the "wind-blower" and the "thunder-giants" are simply the "wind-bird" and the "thunder-birds" of the Western Algonkian tribes modified to suit circumstance and locality.

This view seems to be confirmed by the statement of Dr. F. V. Hayden[1] respecting the Crees: "Indeed, these Indians do not seem to fear any natural phenomena except thunder, which is supposed to be the screaming and flapping of the wings of a large bird, which they represent on their lodges as a great eagle. Wind is supposed to be produced by its flying, and flashes of lightning are caused by the light of the sun reflected from its white and golden plumage, and when strokes of lightning are felt they are thunder-stones cast down by this bird. All storms, tornadoes, etc., are caused by its wrath, and fair winds, calm and fine weather are regarded as tokens of its good humor." Here the wind-bird and the thunder-bird are regarded as one, and, as with the Ojebways, the bird takes on the form of an eagle in pictography, sculpture, and ornament. On the whole, the Algonkian beliefs respecting thunder seem more akin to those of the Siouan than of any other Indian peoples. With the Tetons the snake appears as the enemy of the thunder. Rev. J. Owen Dorsey[2] thus describes the Teton thunderers: "Some of these ancient people still dwell in the clouds. They have large, curved beaks, resembling bison humps; their voices are loud, they do not open their eyes wide except when they make lightning, and they have wings. They can kill various mysterious beings, as well as human beings. Their ancient foes were the giant rattlesnakes and the Un-kche-ghi-la or water monsters, whose bones are now found in the bluffs of Nebraska and Dakota." In the Omaha and Ponka myths thunder-men and thunder-birds appear, and the story of a visit to the nest of the thunder-bird is related.[3]

A close and detailed comparison of Siouan and Algonkian thunder stories and folk-lore would be of great interest and value, and might perhaps shed some light upon the relations of these two great peoples in the past.

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[1] Transactions of Amer. Philos. Soc., vol. xii (N. S.), p. 245.

[2] Journal of Amer. Folk-Lore, ii, 135, 136. Compare the Onondaga tale of the serpent and the thunderers, *ib.*, i, 46.

[3] Rev. J. Owen Dorsey, in Journ. of American Folk-Lore, i, 75–77.

XUM

VESPER HOURS OF THE STONE AGE.

BY JOHN G. BOURKE.

Although it is scarcely twenty-one years since I first crossed the Missouri river and began my acquaintance with the then wild tribes which roamed the valleys of its great tributaries and those of the Rio Grande, the Gila, and the Colorado, the interval has been extended enough to see them all not merely subjected to a condition of peace, but in most instances notably advanced in the path of civilization, their children trained in the white man's ways, and all traces of earlier modes of life fast fading into the haze of tradition.

It may, therefore, not be wholly without interest for an actual observer to describe, in a few words, some of the peculiar features of the closing hours of the Stone Age.

Weapons.

Most of the tribes herein considered were, to an insignificant degree, armed with muskets and rifles of old patterns, and occasionally with revolvers; but in both war and the chase they were mainly dependent upon weapons of their own manufacture.

Lances, arrows, and clubs were their principal offensive weapons. Stone scalping-knives of the broad, leaf-shaped pattern were still worn suspended from the neck.

Such fire-arms as had been obtained were invariably deprived of the iron butt-plate and one of the bands, and had the stocks scraped down in order to secure a minimum of weight.

Among the southwestern tribes the stocks were nearly always fantastically ornamented with brass-headed nails, and, when procurable, with the sacred green *chalchihuitl*, the gun being looked upon as "medicine." In this connection it may be well to observe that the Apaches of Arizona, New Mexico, and Sonora were among the first people in the world to reload the copper cartridge, which was done in a crude and laborious but efficient way by boring a hole in the base of the cylinder, inserting the old-fashioned percussion cap, and then refilling with powder.

XUM

The Apache never failed to provide himself with two willow shoots, thirty inches long and half an inch in diameter. These were hardened in hot ashes and then peeled. When shooting, the Apache would hold these sticks in his left hand, criss-cross, and make a rest for his fire-arm. This custom undoubtedly can be traced back to the first appearance of the Spanish arquebuse, which was always fired from such a rest.

Spears.—The lance was made of a staff selected from a suitable shoot of the *mescal* (century plant) or the *amole* (soap-weed), ten to twelve feet long. This was tipped with a flint barb, two or three inches in length by an inch in breadth, sometimes with serrated, sometimes with plain edges, fastened to the staff with sinew and gum.

An improvement upon this was made by inserting an old cavalry sabre into the same kind of a shaft and fixing it in place by drawing over it and allowing to dry the sexual organ of the domestic bull. The penetrative power of the lance was very marked; the young warriors constantly practiced with them, using the vertical giant cactus as a target.

Constant practice in the athletic game of *mushka*—which was practically a feat in lance-throwing, allied to the *chunke* found under various forms in so many parts of the American continent—added strength and dexterity to the arms of the Apache warriors. I have known them to pierce a human victim through the body at one thrust, and to transfix a *saguara*, or giant cactus, when advancing toward it on a run, from a point thirty to forty paces distant.

Arrows.—The stone tips of the Apache arrows comprehended all the forms known to archæologists: tongue and diamond shaped, straight or curved edges, serrated and non-serrated, with and without tangs. The Apache arrow, it should be stated, was composed of three parts: the reed, the stem, and the barb; the last affixed to the stem and the stem inserted into the reed, and both firmly held in place by ligatures of sinew. The stem was made of a hard wood called kiong, the shaft of the carrizo or klokâ. The use of sinew for securing the barb to the stem was believed to be based upon the fact that after the arrow had entered the body the warm blood flowing from the wound would soften and loosen the sinew, disengage the point, and increase the discomfort, pain, and danger of the victim.

Arrows intended simply for the killing of birds or small game were not always barbed, but were generally provided with a cross-piece about two inches below the tip.

Bows.—The bow was made almost always of the tough, elastic mountain mulberry, called, par excellence, *iltin* or bow-wood. Occasionally, the cedar was employed, but bows of horn, such as were to be seen among the Crows and other tribes of the Yellowstone region, were not to be found among the Apaches and their neighbors in Arizona.

The elasticity of the fiber was increased by liberal applications of bear or deer fat, and on rare occasions sinew was glued to the back for the same purpose.

The rule laid down by the Apaches for making their bows and arrows was the following: The length of the bow, or rather of the string, should be eight times the double span from thumb to little finger of the warrior using it. The curvature of the bow was determined almost entirely by individual strength or caprice. The shaft should equal in length the distance from the owner's armpit to the extremity of his thumbnail, measured on the inner side of his extended arm. The stem should project beyond the reed to a distance equal to the span covered by the thumb and index finger; this measurement included the barb, when made of sheet-iron. The iron barb itself should be as long as the thumb, from the end to the largest joint.

Stone arrow-heads were made preferably of obsidian (*dolguini*), next of chalcedony, lastly of pieces of beer bottles, but the process of manufacture was in each case the same, and consisted in chipping small fragments from the edges of suitable pieces of material, the chipping implement being a portion of hardened deer or elk horn, held in the right hand, the silicious stone being held in the left over a flap of buckskin to protect the fingers. Four or even five arrows could be discharged with a rapidity equal to or even greater than that of the firing of the same number of shots from the old-fashioned revolver.

I made it my business to determine exactly how many minutes were requisite for making a serviceable arrow-head. I singled out an Apache at random and stipulated that he should employ no tools of iron, but allowed him to gather from the ground such pieces of chalcedony as he pleased. He made a number of barbs, the time as recorded in my note-book being five, six, seven, and eight minutes. An expert would have completed the barbs in less time; but the problem was to determine how long it would take Apache Indians, whose village had been captured and destroyed by troops,

to provide themselves anew with weapons which would render them a menace to the scattered settlements of the frontier.

A good lance-head could not be perfected quite so soon. It could be made in a very short time, but in exactly how many minutes I am unable to say.

The Apaches have a myth which states that they overcame all the tribes in their path because the god, *To-va-dis-chinni* ("The Mist Rising from the Water"), placed them in a reed swamp and gave them pieces of obsidian as tips for their arrows. When read between the lines this myth relates an important truth: The Apaches did subdue or drive the other tribes before them on account of having better arrows, made as described.

Feathering.—At the lower end of the shaft were three half feathers of a hawk, fastened at each end with sinew, and in the direction of the axis. Each feather was as long as the inner seam of the second finger. No rule was found for placing the slot of the arrow, and in the same quiver I have found some in which the slot was in the same plane with the barb and in others perpendicular to it. These rules of measurement apply only to this particular class of arrows.

I am able, from my own recollection, to supply a number of illustrations of the great force with which the arrow was discharged, although a person for the first time observing an arrow coming towards him would be surprised at its apparent lethargy. In the summer of 1871 I was riding by the side of General Crook, on the summit of the elevated plateau known as the Mogollon Mountains, in Arizona. We were a short distance ahead of a large column of cavalry, and our immediate party was quite small. We ran into an Apache ambuscade; a number of arrows were discharged, two of them piercing pine trees to a depth of at least six inches. On another occasion a pine door, three-eighths of an inch thick, was penetrated. In July, 1870, a friend of mine, M. T. Kennedy, was mortally wounded by an Apache arrow which pierced his chest. The autopsy disclosed the fact that the arrow had no head.

The Apaches poisoned their arrows by rolling the stem in deer liver which an enraged rattlesnake had been made to bite. Their efficacy was more imaginary than real, because I have seen dogs, pigs, birds, horses, mules, and human beings wounded by such poisoned arrows and cannot recall the slightest increased danger or even the slightest additional inflammation from wounds made by them.

From their tenderest years Apache youth were trained with bow and arrow as with the lance, and, as a consequence, they attained a marvelous precision and rapidity in their use.

Slings.—In the use of the sling the Apaches were inferior to the Yumas, the reason being that the Yumas lived in the Colorado bottom which is filled with inexhaustible quantities of smooth, round, water-worn pebbles, admirably adapted for missiles.

The Apache were also expert in throwing stones, and often killed quail and turkeys with pebbles.

War-clubs.—The war-club of the Apache was an admirable weapon: a stone of suitable size and shape was sewed up in a cow's tail; then a space of four inches was left in the tail, and lastly, a round stick was sewed in to give strength and rigidity and to serve as a handle. The hair was left pendant, as it kept the hand from losing its hold when covered with human blood.

There was a radical difference between the Apache type of war-club and that of the *macan* of the Pimas, Maricopas, Yumas, Chemahuevis, Cocopahs, Opatas, and others. These *macanes*, or "potato-mashers," as the soldiers used to call them, are well described by their nickname. They were made, ordinarily, of the hard and close-grained wood of the mesquite and were a very effective weapon at close quarters.

By all these tribes the war-club was used in the same manner. Having located a *rancheria*, or village, of their enemies, they would surround it at night and when light first appeared in the east would raise a yell, shrill and unmistakable in its blood-curdling significance. The terror-stricken foe, rushing out pell-mell from their frail *jacales* were obliged to go down on their hands and knees to get out of the low openings. Crouched in this defenseless position, they would hardly have protruded their heads, when crack! would come the *macan* or war-club of the blood-thirsty assailants.

The Pimas and Maricopas used to be greatly addicted to plundering, in which they rivalled the Prussians. Almost the moment a hostile *rancheria* was attacked, pillaging began.

Blow-gun.—Inquiry was made among the Apaches in regard to another peculiar implement of war, the blow-gun of the tribes of the Orinoco and Essequibo, called "*cerbatana*" by the first Spanish explorers. It is not unlikely that the Apaches were once familiar with some form of the blow-gun, because their children occasionally make use of a toy constructed on the same principle; but nothing

definite on this head could be extracted from them. The blow-gun is still in use among the Cherokees of the mountains of North Carolina, from whom I obtained one last summer.

Boomerang.—By many, if not all the tribes surrounding the Apaches, the boomerang has been used from time immemorial in hunting the jack-rabbit and the field-rat. The Apache secures these toothsome viands by other means, and has no use for the boomerang. A form of the boomerang, studded with cruel teeth of obsidian, has been described by the early Spanish writers under the name of *maquahuitl*. It is said to have been a formidable war implement of the tribes of Anahuac and of those living near the Rio Grande, who could cut off a man's head with it. Not the slightest knowledge of this weapon exists among the Apaches of our day, and there are no references to it in their traditions or myths. But I heard something of a former use of the *maquahuitl* among the Rio Grande pueblos, and was assured by an old Indian, of Taos, New Mexico, that there was in that town at the time of my visit a weapon of this description, but the assertion was not verified. This old Indian insisted that a man's head could be cut off with this weapon, unconsciously corroborating the old Spanish story. Some of the bands of Siouan stock, on the Upper Missouri, retained a modification of the *maquahuitl* until within very recent times. It was a sort of tomahawk with long, sharp teeth of steel

Shields.

Shields, made of the hide of the buffalo's neck, were still in general use. A hole was dug in the ground and filled with hot embers, over which was strewn a layer of earth. A piece of hide of the requisite size and shape, or rather of a little larger size than was strictly necessary, because shrinkage had to be allowed for, was next pegged down to the ground, covering the improvised oven; then came another layer of earth and a top layer of hot coals; the effect being that the hide was slowly and evenly baked and hardened without being burned or cracked, and was made capable of resisting the old-fashioned, round, leaden pistol or musket bullet. When ornamented with the owner's totem and gaily decked with eagle feathers which serve the triple purpose of decoration, of frightening the enemy's horses, and, as the savages thought, of resisting arrows, the shield was pretty to look upon and a good means of protection from the missiles of past eras.

Mortars, &c.

There were various forms of metates, mortars, and mullers for grinding acorns, mesquite beans, grass seeds, and paint. Frequently rocks *in situ*, provided with suitable depressions on their surface, were so used. Such were the rocks in the Gila Cañon, at the Bâ-bi-tui or Coyote Springs, in Pinal Creek, and elsewhere.

Stone mortars of great size were once to be found in Green Valley, where they formed the mills of the Apaches for grinding acorns so abundant there. Whether or not these belonged originally to a people of Pueblo type whom the Apaches displaced, cannot now be determined. The mortars themselves have all disappeared, having been carried off by American miners in which to crush auriferous rock.

No time need be spent in describing the stones used in heating vessels of grass and palmilla—those for heating the *ta-a-chi* or sweat baths, or those for cooking *mescal*—except to say that they were always selected from silicious rock, which would not split under high temperatures.

Boring-tool.

With an ordinary arrow held between the hands and revolved vertically the Apaches bored holes in beads. A bead of *chalchihuitl* was made in my presence under circumstances of great disadvantage in a trifle less than twenty-six minutes.

Fire-stick.

In the butt of the lance-staff a hole was bored and to it was attached by a string, the essential fire-stick, because matches were as yet scarcely known. The time required for making fire by this method, according to my personal observation, ranged from eight to forty-seven seconds; but the Apaches assured me that they could make it, under the most favorable circumstances, by running their hands down the vertical stick only once, which would occupy not quite two seconds as recorded on the watch. A sprinkling of sand increased friction and hastened the process very much. Two things are worthy of mention while speaking of this subject: the great volume of smoke that issued from the point of contact of the sticks and the total absence of flame.

Amulets.

All the American aborigines used stones as amulets. The most familiar examples are the arrow and lance heads which had once

killed enemies, or, in the hands of the enemy, had failed to kill the owner himself. Two or three arrow-heads were appended to the necklace of human fingers which I secured during a fight with the Cheyennes of northern Wyoming during the winter of 1876, and which has since been deposited in the National Museum. The information obtained in regard to these was always vague and far from satisfactory, but better fortune attended my investigations into the nature and uses of the "medicine arrows" worn by the women among the Apaches and Pueblos. I have the only one of these ever given into the keeping of a civilized man. It had been worn for years by *Tze-go-ju-ni* ("Pretty Mouth"), an Apache squaw who claimed great skill as a midwife, and was in the habit of administering a pinch of powdered arrow in water in cases of painful gestation and protracted labor. She explained that whenever lightning happened to fell a pine tree on the top of a high mountain, the medicine men would hunt around to see if there was any rock at the foot of the blasted trunk which would yield fire when struck. Such quartz veins are, of course, common enough, and the only thing that remains to be done is to shape a piece of the stone into a lance-head.

One of these "medicine arrows" was seen by me in the Pueblo of Acoma, New Mexico, in 1886. The woman who owned it acknowledged that its uses were identical with those of the same amulet among the Apaches, but absolutely refused to sell or trade upon any terms.

Just such amulets, endowed with the same virtues, have been employed all over the world, in Europe as well as in Asia, in early times as well as in our own day.

A chapter of references to this topic has been compiled from various authorities in the course of my studies and will soon be published. I wish only to add, at this time, that the "elf shots" of he European peasantry may fairly be placed in the same category.

Garcilasso de la Vega, in his "Commentarios Reales," made the curious statement that in Peru, whenever lightning struck a tree, the priests were careful to mark the spot to prevent the people from approaching and incurring the displeasure of supernatural powers.

In the new light thrown upon this matter by *Tze-go-ju-ni*, it is not at all unlikely that Garcilasso de la Vega, who was less than thirteen years of age when he left Peru, was entirely in error, and that what the priests really intended to do in such cases was to preserve the stricken trees for the manufacture of amulets and talismans.

The worship of stones was still further developed among the Apaches. I have been taken by these Indians to one of their sacred caves in the Tonto Basin in which was a stone phallus; in another the medicine men had danced and sung around stalactites and stalagmites which yielded musical resonance under the sturdy blows of their clubs. I did not see this dance, but the natives who conducted me to the cave, and whom I found to be perfectly reliable, showed me the stones and the places where the medicine men stood.

The sacred stone-heaps described in all other parts of the world are frequent in Arizona where the Apaches call them "*tze-nachie.*" I have prayed, cast stones upon these heaps, spat upon grass, blown my breath, and made a little backward jump precisely as the Apaches instructed me to do; but as this article has already exceeded the limits originally intended, and as it is trenching upon the more strictly religious side of Apache life, I will reserve further information for treatment under that head.

THE TONOCOTES OF SOUTH AMERICA.—One of the most numerous nations of Indians in the Tucuman region of Spanish South America were the so-called Tonocotes or Toconote tribes, mainly to be found near the upper parts of the rivers Salado and Vermepo. In some extraordinary manner their nation and their language seemed to have slipped out of the memory of all concerned until about the middle of last century Father Machoni, of the Society of Jesus, wrote his curious work on the so-called Lule and Tonocote language. Hervas, in his famous *Catálogs de les Lenguas*, has questioned the correctness of the hypothesis that Machoni's Tonocote represents the Tonocote of the early Missionary Fathers, &c., and it seems that Jolis, in his book on the Chaco, expressed the same opinion, and there the matter has pretty well rested until the present day. Late investigations, however, seem to point in another direction and confirm Hervas' and Jolis' doubts.

Machoni certainly does not say his dialect is Tonocote, he only mentions the fact that these Indians left Tucuman and went to the far north, and as he had discovered these strange Indians speaking a language very different from that of the surrounding Chaco nations, he allowed his readers to infer that it must be Lule-Tonocote. So far no so-called Lule-Tonocote grammars or vocabularies have turned up, and it is evident they had already been lost even before

Machoni's time, and so he started or rather allowed others to start hypothesis that an unknown lost language must coincide with an unknown found language.

I have now been able to ascertain that the Tonocotes must have been Mataco Indians, tribes which still swarm in all the upper region of the Vermepo and Pilcomayo rivers, and that the original Lule tribes were so called by the Matacos because they found them occupying the country when they immigrated into it. Lule is a Mataco combined word meaning—the inhabitants. Lules were the hill-tribes of the Anconquija range and spoke *Cacan*, a language in process of being restored to the knowledge of South American philologists. Matacos, like all the Chaco dialects of the Abipon type, use prefixed particles mainly, Machoni's Lules and Tonocotes suffix them, so that the two groups belong to different families.

The above remarks are a summary of an essay I am preparing on the ethnology of the Argentine Republic, or rather of the basin of the River Plate. Hervas and Machoni's books are easily obtained and any one interesting himself in the subject can read up what those authors have to say about Lule-Tonocotes. It is very possible that Machoni's Lule-Tonocotes, together with the Vilela and Chulupí or Chunupí tribes, may be a remnant of the older race which occupied the country at the time of the great Caribic invasion some 2000 years ago.

Hoping you may find the above of some interest, I remain very truly yours,

SAM'L A. LAFONE QUEVEDE.

BUENOS AYRES, *October 29, 1889.*

ARROW-HEAD MAKING.—In *Ymer*, the journal of the Swedish Anthropological and Geographical Society of Stockholm (v. 18, 1888, pp. I, II), are notes on ethnographic observations made during a passage through the Straits of Magellan on the Swedish frigate *Vanadis*, by Dr. Hj. Stolpe.

One of the most interesting things in the article is the description of the manufacture of arrow-heads of glass obtained from bottles of European manufacture. " . . . the bit of glass is wrapped in the common cloak of guanaco-skin and roughly shaped by biting. The arrow-head is then finished by flaking with an albatross-bone."

JOHN MURDOCH.

THE FIGHT WITH THE GIANT WITCH.*

BY GARRICK MALLERY.

This Abnaki myth or folk-tale was communicated to me by Mrs. W. Wallace Brown, of Calais, Maine, by whom and her husband (who for a number of years was superintendent of the Passamaquoddy branch of the Abnaki at its reservation) it was translated. They gave to me many other mythic tales of the tribe which, like this one, are very different in spirit from those published in Mr. Charles J. Leland's work entitled "Algonquin Legends," although that work deals exclusively with the Abnaki, and the Micmacs, their next neighbors and congeners. As these tribes together form but a small part of the Algonquin linguistic family, the title of the work, "Algonquin Legends," is much too comprehensive.

After two field-seasons spent among the two tribes mentioned, it was apparent to me that a full and unselected collection of their myths and tales would not exhibit the peculiarly harsh and violent character assigned to them by Mr. Leland, which peculiarity is explained by him on a theory of Scandinavian influence. The facts do not require any such explanation. The myths of those tribes are similar in their essential character, and indeed in many of their details, to those of other bodies of Indians throughout the northern and inland parts of the United States between whom and the Scandinavians contact has never been suggested. It is also a fact that the Abnaki and Micmac are now, and have been during historic times, more gentle than most of the Indian tribes.

In the present story the active work of poohegans or attendant daimons, translated as "guardian spirits," will be noticed, and their combats. They were generally animals, more properly the archetypes or ultimate progenitors of the particular animals. The one poohegan, whose name is, perhaps with too great metaphysical signification, translated "Thought," may refer to the crude idea of spiritual communication at a distance, which was common among the Indians and for which modern mystics have several terms.

* Read before the Society.

The information afforded by visions in dreams also appears. The word translated as "Fairy" is probably applicable to one of the "little people," which supernatural race is often the subject of western as of eastern story.

The daimon called "Disease" affords an illustration of the common Indian doctrine that all diseases were unnatural—that is, supernatural, and were the work of malign beings.

A PASSAMAQUODDY MYTH.

Many, many, long years ago, there dwelt in a large cave in the interior of a great mountain an old man who was a Keewauk-M'-telolen or Giant Witch.

Near the mountain was a large Indian village the chief of which was named Hass-ag-wauk, the Striped Squirrel. Every few days some of the chief's best warriors mysteriously disappeared from the tribe. Hass-ag-wauk soon became convinced that they had been killed by the Giant Witch and he called a council of all the noted witches who possessed the greatest power. They gathered together in a new strong wigwam made for that purpose. There were ten of them in all, named Quar-beet, the Beaver; Moosque, the Wood-worm; Quag-sis, the Fox; K'cheattosis, the Serpent; Eag-winn, the Loon; Cosque, the Crane; Moo-in, the Bear; Lox, the Devil; K'che-pelogan, the Eagle; Wabb-tek, the Wild-goose.

The great chief Hass-ag-wauk addressed the witches and told them that he hoped that they might be able to conquer the Giant Witch, and that if possible it must be done at once or his tribe would be exterminated. The witches resolved that they would commence the battle the next night and use their greatest powers to kill the Giant Witch. Now the Giant Witch could foretell all his troubles by his dreams, and on that very night he dreamed of all the plans which the witches contemplated for his destruction. Now all Indian witches have poohegans or guardian spirits. The Giant Witch sent one his poohegans, little Al-umusett or the Humming-bird, to the Chief Hass-ag-wauk telling him that it would not be fair to send ten to fight one, but that if he would send one witch at a time he would be pleased to meet them. The chief sent word in return that the witches would meet him in battle one at time. The next night the witches met as appointed, as soon as the sun slept, and it was agreed that the Beaver should fight first. Now the Beaver had So-ga-lum or Rain for his poohegan and he caused a great

flood to come and fill up the cave where the Giant Witch lived and by this means hoped to drown him. But the Giant Witch had the power to change himself into a Sequapp Squtten or Lamper Eel and held fast on to the side of his cave and thus escaped. The Beaver, thinking that the Giant Witch was probably drowned, swam down into the cave and got caught in a k'pagu-teehegan or beaver-trap which the Giant Witch had purposely set for him. Thus the Beaver is conquered. The next witch to fight is Moosque, the Wood-worm, whose poohegan is Fire. The Wood-worm told Fire that he would bore a hole down into the cave that night and that on the next night he wanted Fire to go down into the hole and by this means burn the Giant Witch. The Wood-worm went to work and with his sharp head and by whirling himself around like a screw soon made a deep hole in the side of the mountain, but the Giant Witch knew what was going on and he sent his poohegan, Humming-bird, with a piece of cheequaqu-seque, punk, and put a plug in the hole so tight that the Wood-worm could not get back and the next night when Fire went into the hole he set fire to the punk and burnt up Moosque, the Wood-worm, and thus perished the second witch.

The next witch to fight was K'cheattosis, the Serpent. He had Hummewess, the Bee, for his poohegan. The Bee called all of the bees together and they went into the cave and swarmed all over the Giant Witch, which made him roar with pain; but he sent the Humming-bird and collected a lot of birch bark and set it on fire which made a dense smoke and stifled all the bees. After waiting some time the witch, Serpent, went into the cave to see if the bees had killed the Giant Witch, but he got caught in a dead-fall which the Giant Witch had prepared for him. The chief Hass-ag-wauk was now almost discouraged at having lost three of his best witches without accomplishing anything; but seven more remained. The next witch to fight was Quagsis, the Fox. His poohegan was K'see-no-ka, Disease, and he sent him to afflict the Giant Witch with all kinds of sickness and he was soon covered with sores and boils and every part of his body was filled with aches and pains, but he sent his poohegan, Humming-bird, to Quilip-hoit, the god of medicine, who gave him the plant Kee-kaywee-N'bisoon, which as soon as it was administered to the Giant Witch immediately cured him of all his diseases. The next witch to fight was Eagwin, the Loon, whose poohegan was T'ka-iou, Cold. In a short time the mountain was covered with snow and ice and the cave was filled with cold blasts

of wind, the frost cracked the trees and broke asunder the great stones. The Giant Witch suffered terribly, but did not become discouraged. He tried his magic stone and heated it red hot, but it was so cold that it had lost its power and could not help him. Alumusett, the Humming-bird, had both wings frozen and could not be sent on any more errands; but one of the Giant Witch's best poohegans was Lithuswagon or Thought, and he sent him like a flash to Sou-nessen, the South Wind, to come to his aid. In a short time the warm South Wind began to blow around the mountain, and the cold was obliged to disappear from the cave. The next witch to fight was Cosque, the Crane, whose poohegan was Kee-wauk, the Giant-with-a-heart-of-ice, who soon went to work with his big stone hatchet and chopped down all the trees and tore up the rocks and commenced to cut a large hole into the solid rocks in the side of the mountain, but the Giant Witch, now for the first time, let loose his great and terrible dog M'dasmoose, who barked so loudly and attacked Kee-wauk so fiercely that he was frightened off. The next witch to fight was Mooin, the Bear, whose poohegan was Badogiek, Thunder, and Pa-sock-way-tuck, Lightning. Soon a great thunder-storm took place which shook the whole mountain and a thunder-bolt split the mouth of the cave in two. The lightning flashed into the cave and nearly blinded the Giant Witch who was now terribly frightened for the first time and he cried with pain for he was badly burned by the lightning; but the Thunder and Lightning redoubled their strength and filled the cave with fire. The Giant Witch was now greatly alarmed and quickly sent the Humming-bird to summon Haplebemlo, the Great Bull-frog, to come to his aid. He soon came and spit out his great mouth full of water which nearly filled the cave and extinguished the fire and drove off Thunder and Lightning. The next witch to fight was Lox, the Indian devil. Now Lox was always a coward and when he learned of the misfortune of the other witches he cut off one of his big toes and when the great chief Hass-ag-wauk called him to go fight he made the excuse that he was lame and could not go. The next witch to fight was K'chee-pe-logan, the Eagle, whose poohegan was Applaus-um-luessit, the Whirl-wind. When he went to the cave of the Giant Witch with all his fury and violence and noise he awoke the Giant Witch who had been asleep and who at once k'pla-moosooke or lost his breath and was unable to speak, but he made signs to the Humming-bird to go for Cul-loo the chief of all

great birds, but the wind blew with such strength that the Humming-bird could not get out of the mouth of the cave but was always driven back again. The Giant Witch now sent his poohegan Thought, to command Cul-loo to come to his assistance. In a moment the Great Bird came and made such a great wind with his wings at the mouth of the cave that the power of the Whirl-wind was useless. The Chief Hass-ag-wauk now became discouraged as but one more witch remained to fight and this was Wabb-tek or Wild Goose, who was a very quiet and clever fellow and never quarreled with any one and was not regarded as a powerful warrior. Now the chief had a dream in which he saw a great giant, who stood before the mouth of the Giant Witch's cave and was so tall that he reached from the earth to the sky, and he said that all that all that was necessary to do to destroy the Giant Witch was to have some young woman to entice him out of his cave when he would lose his power and that he, the giant, would then kill him. The Chief Hass-ag-wauk told his dream to the witch Wabb-tek, Wild-goose, and ordered him to do as he had been told to do in the dream. Now the Wild-goose had for his poohegan Mickum-wiss or a Fairy, who changed himself into a beautiful young woman and went to the mouth of the cave and got up into a large hemlock tree and sang a song :

Come to me young man !
Come hear my sweet song !
Come out this beautiful evening—
Come on this beautiful mountain—
Come see the leaves so red !

The Giant Witch soon heard the singing and came to the mouth of the cave, and was so fascinated by the singing that he came out of the cave and saw a very beautiful young woman up in the tree who said to him, "W'litthodd m'on nachi-pen-equlin w'liketuqu he moos," "Please, kind old man, help me down this tree." As soon as he came near the tree Gloos-cup, the great king of all men, dodged from behind the tree and threw his stone hatchet at him and split his head open. Then Gloos-cup addressed the Giant Witch and told him, "You have been a wicked bad witch and have destroyed nearly all of the Chief Hass-ag-wauk's best warriors. Now speak once more and tell what you have done with the bones of your victims." The Giant Witch replied that in the hollow of that mountain could be found an immense heap of human bones which

was all that remained of what were once the great warriors of Hass-ag-wauk's tribe. As soon as he was dead Gloos-cup summoned together all the beasts of the forest and all the birds of the air to come together and eat the body of the Giant Witch. Then Gloos-cup ordered the beasts to go into the cave and bring forth the bones of the dead warriors, which they did; then told the birds to take each a bone in their mouths and pile them together at the village of the Chief Hass-ag-wauk. Then Gloos-cup ordered the Chief to build a wall of large stones around the heap of bones and cover them with wood and make equnak'n, the hot bath.

Then Gloos-cup set the wood on fire and commenced to sing his magic song. Then he ordered more wood to be put on the fire and water to be poured on the heated stones. Gloos-cup sang louder and faster until his voice skook the whole village and he ordered the people to close their ears or his voice would kill them. Then Gloos-cup redoubled his voice and the bones began to move by the heat and began to sizzle and make a peculiar sound. Then Gloos-cup sang his resurrection song in a low voice. At last the bones began to sing with Gloos-cup and he sprinkled on more water and the bones came together in their natural places and soon became natural human beings again. The people were amazed at Gloos-cup's power and the Chief Hassag-wauk gathered all the neighboring tribes together and celebrated the great event with the Resurrection feast which lasted for many days, and the tribe of Chief Hass-ag-wauk was never troubled by evil witches forever afterwards.

Rig Veda Americana.—Under the above title Dr. Brinton announces a volume on the sacred songs of the ancient Mexicans. It will be supplied with a gloss in Nahuatl and be edited with a paraphrase, notes, and vocabulary by himself. Dr. Brinton considers these songs the most ancient authentic examples of American literature in existence. Besides the light they throw upon Mexican religious thought and mythology they illustrate the archaic form and sacred locutions of the language. The book will be published by subscription; price, $3.

H. W. Henshaw.

OMAHA CLOTHING AND PERSONAL ORNAMENTS.

BY J. OWEN DORSEY.

The material for this article was collected by me on the Omaha reservation, in 1878–'80, and revised in the summer of 1882, with the assistance of two Omahas, two Crows, and the late Joseph La Flèche.

Garments were usually made by the women, while the men made their weapons.

MEN'S CLOTHING.

Some of the Omaha and Ponka (whose customs resemble those of the Omaha) have adopted the dress of the white men. The ancient dress consisted of buffalo robes, breech-cloths, leggings, and moccasins. Shirts were not worn. Blankets have been introduced by traders and the Indian Bureau. There is no distinction between the dress of dignitaries and that of the common people. Several kinds of face and head coverings were used. In cold weather they used to wear the *Te in-de ha wa-dha-ge*, a hat made of the black hair which grows on the face of the buffalo near the chin. This hat was worn over the head and face. Another protection for the face and ears was made of the skin of a wild cat. The skin was tanned and whitened.

Min-gha-san nin-du-dhi-se wa-dha-ge was a hat made of the feathers of the brant from the middle of the body to the tail-feathers inclusive. This hat was worn occasionally by those who went on the war-path and not at other times.

Ma-shu-pa-gdhan is a cap made of the tail-feathers of eagles. It extends down the back, nearly to the feet.

Khi-dha wa-dha-ge or *Khi-dha dha-ge* of the Omaha and Ponka (*Khü-yu-laⁿ-ge* of the Kansa), is a cap made of the entire eagle-skin.

Te-zhin-hin-de wa-dha-ge, a turban made of yarn and beads, is of modern origin, and is worn for ornament, as in the dances.

Ta-hin wa-gdhan, a head-dress used by the Omaha, Ponka, Iowa, and Oto, was made of a deer's tail ornamented with peacock's feathers and the rattles of snakes. This and the "Crow" were re-

wards of bravery and were worn during the *He-dhu-shka* and scalp dances.[1]

Ka-ghe mi-gdhan or "Crow." This was made on two parallel sticks and was covered with porcupine work. On one side hung the *ibe* or tail of a crow, while from the other was suspended the tail of a coyote. Both sticks were fastened to a belt and projected out from the back of the wearer.

Masks were used by the young men when they entered lodges to beg. They were made of bladders softened by pulling with the hands, and they had holes for the mouth, eyes, and nostrils.

Belts were formerly made of any kind of skin procurable, as of the buffalo, deer, or antelope. Since the advent of the white man, these Indians have made two other kinds of belts, the *ha i-gdha-ze* and the *te-zhin-hin-de i-pi-dha-ge*. The former is made of strands of *wa-han'* or yarn, which are interwoven. The latter is made of yarn in like manner, but with beads strung on as described by Dougherty in his account of the Omahas.[2]

"In the manufacture of this common and much admired article of dress, ten double threads are attached by one end to a small *wang* (*wahan'*, J. O. D.) or shreads of leather (*sic*), which is firmly stretched and fixed transversely to the work; each double thread is placed at such a distance from the adjoining ones as to give room for the beads. These are then strung on, one on each double thread. By this operation a transverse row of beads is formed upon the work parallel to the *wang*. This being done, the left double thread is passed to the right, not over and under, but through all the double threads, parallel to and in contact with the beads, and in this position occupies the situation of woof or filling; but its extremity is continued along on the right side of the work, so as to resume, in that portion of its length, the character of warp or chain. Another row of beads is now put on; after which the next left-hand double thread is passed through each of the others to the right of the work, as the previous one had been."

Breech-cloths were made of deer-skin or antelope-skin, but now a piece of an old blanket is generally used for that purpose.

Robes (*iwa-in'*) were made during the winter, because the winter skins or *me-ha* had thick hair. The string for fastening the robe around the neck was called the *iñ-ke-gdhe-shtañ-ga*, a name now

[1] See p. 329, "Om. Soc.," in 3d Eth. Rept.

[2] In Long's Expedition to the Rocky Mts., Vol. I, p. 286–7.

given to buttons. Robes were worn with the hair out by chiefs and others on special occasions. These robes were often decorated on the smooth side with blue, red, and black lines, forming various designs, some of which referred to past events in the life of the wearer.

Mittens were made of buffalo hides that had thick hair, but now some of them are of elk-skin. They were short and rounded a little at the top. They were worn only by the aged men and women.

Foot Coverings.—Under the moccasins and next to the feet were the native *hin-be' ga'-win-ghe,* made of buffalo hair taken from the head, or of red grass which had been pulled in the hands till it became soft. This hair or grass was wrapped round and round (*ga-win'-ghe*) the feet previous to putting on the moccasins. Even when the grass became wet it was still a good covering. Since these Indans have encountered the white men they have in some cases adopted the socks and stockings, which they now call *hin-be ga-win-ghe.*

Moccasins were called *hin-be* or *han-be.* These are distinguished from those of other tribes by the shape of the sole, the number and positions of the *hin-be ga-she-gdhe* or tags on the moccasin heels, and by the *hin-be-di-ha* or flap next the ankle, as well as by the character of the designs of porcupine-work or bead-work on them.

The Ponka used to wear moccasins like those of the Omaha, but recently they have adopted the Dakota styles. An Omaha *hin-be-di-ha* is rounded at the ends next the toes and is about two and a half inches wide, extending nearly down to the sole of the moccasin. A Ponka *hin-be-di-ha* is angular at the ends next the toes and is not over one inch and a half in width. The flaps are turned up and tied around the ankles in bad weather. The Omaha omit the heel tags whenever they desire. Moccasins are generally made in the summer, as the hides of the buffalo slain during that season have little hair on them. When the women make the moccasins they pull off whatever hair there is on the hide, as they also do when they wish to make leggings or skins for tents.

The trail of an Indian has the following peculiarities: First, the sole of the moccasin by its shape marks the tribe of the wearer, except when the style has been borrowed from another tribe; secondly, the heel tags by their number and order furnish another criterion (the Omaha have three, one in the middle and one on each side; elsewhere we find two, equidistant from the middle of the heel;

another tribe has one in the middle and one on the right; still another, one in the middle and one on the left; some tribes have but one, and so on); thirdly, each tribe has its own style of turning the toes in walking. This is caused by the Indian mother who, when the child is in its cradle, ties its feet straight or otherwise between pieces of wood. Omaha and Ponka walk with the toes pointing straight ahead. The Dakota turn their toes in a little, and the Winnebago are exceedingly pigeon-toed. The Pawnee turn their toes out.

Sometimes over-moccasins were worn. The inner moccasins were thin, being made of elk or deer skin, but the outer ones were made of thick buffalo skin and were a few inches higher than the inner pair.

Leggings were worn by both sexes. When the women made them out of buffalo skins, they used to remove the hair. They put on them fringes of deer-skin. The strings for fastening the leggings to the belt were made of the skin of the elk, deer or buffalo.

Garters were of two kinds: The *hi-dha-win dhan* were made of a piece of hide cut lengthwise, or else of interwoven pieces of sinew on which beads were strung. They were the width of two fingers, and were wrapped twice around the legs with the ends dangling.

The *hi-dha win dan-pa* or short garters are as wide as three fingers. Men wear them if they are proud. They also form part of a woman's attire on festive occasions.

Women's Clothing.

In ancient times, the women wore the *ha u-na-zhin*, the *ha wa-te*, the *u-tan*, the *hin-be*, and the *wa-in*. The *ha unazhin* or skin shirt was made of the skin of the elk, deer, or antelope, and the *utan* or leggings were of similar material. The *ha wate* was a skin dress or skirt, made of elk or deer skin. The *wain* or robe was of buffalo hide. The moccasins were plain, without any porcupine work.

Since the coming of the pale faces, the Omaha and Ponka women have made a few changes in their attire, which now consists of a blanket or shawl, a chemise, a calico sacque, a skirt, and moccasins. The calico sacque is made with a cape hanging about a foot down the back. On this account no Ponka man would wear a sailor jacket in 1872-3, as its square turned-down collar resembled the woman's cape. Every woman wears a belt, to which is attached a

knife-sheath. The belt is worn straight around the waist by the Omaha women, but the Dakota women lower it in front, converting thereby the lower part of the sack into a stomacher, which serves as a pocket for carrying sundry articles.

Instead of collars, the Omaha and Ponka wore necklaces. Those worn by men were called, *wa-nan-p'in*. Necklaces of bears' claws are still used by a few men, and probably formed one of the ancient styles. There are several other styles, most of which have been introduced by the traders. Among these latter is one kind made of white shells perforated at the ends, such as are commonly found among the Dakota.

The woman's necklace in called *u-in' ga-zan'-de* by the Ponka, and *u'-in ga-zan'-de* by the Omaha. This necklace is made by stringing (*ga-zan-de*) beads on horsehair, which is interwoven, the beads being arranged in different colors so as to form various designs, such as birds, arrows, and horses.

There were no pockets made in garments. But receptacles for articles were formed by fastening the belt around the robe, blanket or sacque, the belt forming the bottom of the "*u-ti-zhi*," and the articles were then put within the garment. The robe or sacque was allowed to be full, or as white ladies term it, a "Garibaldi waist."

The Omaha and Ponka had no wigs. The one worn by the Ponka chief, Standing Bear, prior to 1879, was given to him (*fide* J. La Flèche) by the Yankton chief, Struck by the Ree, who used to wear it at councils and dances.

Plumes and eagle feathers when worn in the hair are marks of distinction for brave men. See the account of the reception of an infant into the deer gens of the Omaha, pp. 245-6, Om. Soc., in 3d Eth. Rept.

Head-bands were used by the women for keeping the hair out of their eyes. No man wore one except when he had a headache.

Earrings and pendants. A modern kind is the *pe u-ga-shke*, made of pewter. Several of them were worn in each ear.

Another kind is made of a species of white shell, having three names, "the real beads," "the real earrings," and "the real necklace," the latter name having been given because necklaces are made out of them. I have seen oblong pieces of clam shell about two inches long so used by the Ponka, who call them *ga-shpe u-in*, "ear ornaments split from the edge (of the shell) by hitting."

Nose-rings.—A few Omaha women wear them. When J. La Flèche was a boy he saw two young men who wore them.

Breast ornaments.—The kind commonly seen is "*ni ki-de*," which is made of shell, and is about four inches in diameter. In the middle are two small holes, through which is passed the thong by which it is hung from the neck.

Knife-sheaths are attached to the belt on the left side, and are worn by men as well as by women. Those of the men are often decorated with bead-work, and are shorter and narrower than those of the women. The only ornamentation on the latter consists of rows of brass nails or tacks, placed on the wide part of the sheath proper, next the knife blade.

A fire-steel holder was composed of two pieces of skin. The pointed end of the longer piece was turned over after the fire-steel was put in, thus forming a cover for the sheath. The short piece was a square, and was sewed on the square part of the longer piece, forming a pocket or sheath.

Pomades for the hair.—In former days, the chief pomade consisted of buffalo fat mixed with fragrant grass. They also said that if one would take the fat of an otter's tail, melt it and mix it with sweet grass, and then rub the mixture on the head, the growth of the hair would be promoted.

Soaps were unknown, but they cleansed the hands by washing them in ashes and water. After eating, the face and hands were usually wiped with a wisp of grass. See p. 316, Om. Soc., in 3d Eth. Rept.

Combs and brushes were unknown; but they had a good substitute for both in the *kha-de mi-ka-he* or grass-comb. This was made of a very stiff grass, gathered in the spring of the year. The grass is soon knocked down, the twigs are collected, and deer-sinew is wrapped around them, forming a bush which is about the size and shape of an ordinary shaving-brush, but much stiffer.

Tweezers or spiral pieces of wire are now used for removing the beard, mustache, and eyebrows of men. Hair used to be removed from the sides of the head by running a hot stone very rapidly along the head. This was done when the hair was worn Osage fashion.

Mirrors.—A clear stream answered for this purpose, hence the name, *ni u-ki-gdha-sin*, "he peeped into the water at himself," now applied to mirrors.

Perfumes.—Five of these are found among the Omaha and Ponka. The first is the *pe-zhi zan-sta* or "strong-smelling grass," which is plaited into necklaces and carried about by men as well as by

women. This grass has a very pleasant odor, resembling that of the vanilla bean. The second kind is the *i-nu-bdhañ-ki-dhe sa-be*, "the black seeds, which emit a pleasant perfume," columbine seeds.(?) These seeds are tied up in pieces of calico, etc., which are worn about the neck. The third is the *pe-zhi pa* or "bitter grass." The fourth consists of the small seeds found in the *ma-zi zhu* or cedar cones. The fifth is known as the *in-tchañ-ga iñ-gdhe e-gan*, "what resembles mouse dung." It is a grass seed smaller than seed wheat, and is found in Iowa, at the head of a stream which the Omaha call *Mi-ka tan* or "Where raccoons abound."

Porcupine-work.—This and fringe (*ga-sne-sne*) were the only kinds of dress ornamentation known in ancient days. The art of putting on porcupine-work was called *u-dhi-ske*, because the quills were put on as closely as possible, making them lie thick together (*u-ske*). The women used to dye some of the quills red, others black, and some yellow, leaving the rest white. These quills were put on moccasins, leggins, robes, shirts, pipe-stems, quivers, knife-sheaths, tobacco-pouches of deer or antelope skin.

Dyes.—Red dye for quills and horse-tails was made thus: Before frost the women gathered together the sumac berries and laid them away to dry. They also gathered the roots of a fine grass, called "*gdhan-de*," which they pounded between two stones, and mixed with the sumac; the latter not being pounded. There were two kinds of black dye. One was made by taking the yellow unburnt clay from which Indian red was made, mixing it with grease, and putting it into a kettle, where it was fried till it became black. Sometimes the former mixture was put into a kettle in which maple bark had been boiled, and this compound was the other black dye. Yellow dye was the product of the *we-zi-dhe dhin*, which are the yellow flowers of a fine grass which is a parasite of the *zha-kdhda zi* (a plant not as tall as the Nebraska sunflower matures in September, not yet identified). Sometimes these yellow flowers were taken when the sap was in the grass and placed in a kettle with the quills to be dyed. The bundle was tied very tightly and laid away for two or three days. The pressure forced out the sap and this moistened and dyed the quills at the end of that period; but when they wished to dye them very quickly the quills and the flowers were boiled together in a kettle of water.

Bead-work was not known among these tribes prior to contact with the white people. It has superseded porcupine-work among most of the tribes along the lower Missouri river.

Skin ornamentation.—Tattooing was practiced in the early days. La Flèche and Two Crows said that no well-behaved man was ever tattooed; but I have seen several aged men, among whom was the chief Two Bears or Yellow Smoke, and Ki-shta-wa-gu, who were thus marked, one on the fingers and the other on the wrists, with transverse lines. Tattooing was chiefly practiced on the daughters of the principal men of the tribe, who could afford to purchase this great privilege. Such women were marked on the foreheads, breasts, backs, and wrists. The mark on a woman's forehead was a round spot, that symbolized the sun, to which the woman was consecrated by the ceremony. Previous to the ceremony some box-elder wood was charred, pounded and moistened. The operator took an instrument consisting of three or four needles tied to the truncated and flattened end of a stick, so arranged that the points formed a straight line. With this he pricked the charcoal into the skin, following the lines of the figures which had been traced thereon. This tattooing was called "*pe batu.*" i. e. making the forehead blue by pricking it. At present this ceremony of tattooing the women is performed by the young chief I-shta ba-su-de (son of Yellow Smoke) of the Hañ-ga gens. Only chiefs can witness the act. The Osage have a similar custom, but it forms part of the ceremonies of one degree in their secret order. Instead of one spot on the forehead they make two.

The men often reddened the parting of their wives' hair, as well as their cheeks, after they had combed their hair for them. In one of the myths the girl calls on her brothers and grandfather to comb her hair; and an Iowa legend tells of a similar service performed for several days in succession by a husband for his wife. Men used to paint their faces with Indian red, yellow earth, and burnt earth. Some Omahas rubbed common clay or mud over their faces in oblique stripes. Any pattern was made, just as suited the man's fancy. The face was painted with charcoal in time of war. See p. 317, Om. Soc., in 3d Eth. Rept. Among the Osage, each design had its meaning, referring either to the gens of the man or else to the animal or other mysterious being whose aid he invoked. Black earth was used for painting on the buffalo hides in former days, when the badges of the different gentes were painted on the principal tents. See pp. 230, 234, 240, *et passim*, in Om. Soc., 3d Eth. Rept. When they wished to paint a hide, instead of a brush, they used a piece of pumice stone or a dried buffalo bone. The latter was scraped away till it became very thin.

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BOOK NOTICES.

A Lenâpé-English Dictionary. From an Anonymous MS. in the Archives of the Moravian Church at Bethlehem, Pa. Edited, with Additions, by Daniel G. Brinton, A. M., M. D., Professor of Archæology and Linguistics in the University of Pennsylvania, and Rev. Albert Seqaqkind Anthony, Assistant Missionary to the Delawares and Six Nations, Canada. Philadelphia: The Historical Society of Pennsylvania, 1888. (The Pennsylvania Students' Series. Vol. I. Philadelphia: The Historical Society of Pennsylvania, 1889.)

Doctor Brinton has laid students of American linguistics under many and deep obligations, and the volume just issued will materially increase the debt. The "Lenâpé-English Dictionary" is the first of a series of volumes relating to the history of Pennsylvania which are intended to be issued by the Pennsylvania Historical Society. The present book does not purport to be, by any means, a complete dictionary of the Lenápé language. It represents simply the dialect employed by the Moravian missionaries, about the period of 1840, and is chiefly derived from a manuscript in the Moravian archives at Bethlehem, presumably compiled by Mr. Dencke. In its preparation Doctor Brinton was fortunate in being able to secure the co-operation of the Rev. Albert Seqaqkind Anthony, a native Lenâpé, who is perfectly familiar with his language as spoken on the Six Nation Reservation, in Ontario, Canada. In addition to his valuable verification of the form and meaning of the words, this Indian scholar has made many emendations and additions from the present standpoint of the language and from the dialect of the Minsi sub-tribe, thus adding much to the substance and value of the work. Taken in connection with Zeisberger's Dictionary, the student has a very complete dictionary of the Delaware language, though the latter volume is by no means to be compared to the present work in point of accuracy and scholarship. The original dictionary was written, of course, in the German alphabet, which would impair its usefulness to the English student had not

Doctor Brinton furnished a key to the more important alphabetic differences. The extreme clearness and beauty of the type and the general make-up of the volume might serve as a model for future works of this character. A well-prepared index, which is really in the nature of an alphabetically arranged cross-reference, renders easy the reference from English to Lenâpé, and to a great extent makes unnecessary an English-Lenâpé dictionary.

H. W. HENSHAW.

Among Cannibals, an Account of Four Years' Travels in Australia and of Camp-Life with the Aborigines of Queensland by Carl Lumholdz, M. A., Member of the Royal Society of Sciences of Norway, Translated by Rasmus B. Anderson, Ex-United States Minister to Denmark, with Portrait, Maps, Four Chromo-Lithographs and Wood-Cuts. New York: Charles Scribner's Sons. 1889.

This is an octavo volume of nearly 400 pages, handsomely printed, showily bound, and well illustrated. Much of the text is occupied by the personal adventures of the author, descriptions of scenery and of the life of European colonists in Australia, but there is not more than enough of such matter to afford a general interest to the work and to give the reader a fair idea of the surroundings of the race which forms the main subject of the work—the Cannibals of Australia.

The author seems to have gone to the southeastern continent primarily as a zoologist. Anthropology was a secondary consideration in the beginning, but before he left the country it became uppermost in his thoughts. It was to find a mammal new to science that this explorer undertook his most perilous journey, with only native companions, among the wild mountains of northern Queensland; but on his toilsome marches he gathered information that the anthropologist will value far beyond the hard-won skins of the *boongary*, which he went into the wilderness to seek. He adopted the best and, we might almost say, the only method of acquiring original ethnographic facts; he trusted his life among the treacherous natives, lived with them and shared a common lot with them.

The statements which he offers us as the results of a specific purpose in investigation are of great value, but the little items which he has picked up by the wayside when he had apparently no direct aim

in view are of equal or often of higher importance. The comparative and the speculative ethnologist will find this book a storehouse of suggèstive facts.

We know from the works of other explorers that the aborigines of the older Australian colonies possess an elaborate social system, with totemic clans and a complex classification of kinship. Our author has apparently not investigated this question among the races of Queensland, or if he has he tells us nothing directly about it, but we can fairly conjecture that some such system exists in tropical Australia from certain passages, as that relating to name giving on page 230, and that treating of terms of relationship on page 199, and that speaking of tabus on page 136.

The student of American ethnography will, we think, gain a more exalted idea of the cult of the northern Australians from incidents casually related by the author than from his formulated opinions of their religious beliefs. On page 136 we find an allusion to a series of initiations or ordeals which the Australian male has to pass through between youth and old age. They seem somewhat similar in character to those of certain esoteric societies graduated according to age which exist among our American races and which possess most elaborate "work" in the different degrees. The oft quoted *Korroboree* is usually considered by travelers as a mere dance for amusement; our author refers to it as a "festival dance" (p. 236), yet we feel that he gives true key to its purport when he tells us (p. 239), "I could not induce them to explain to me the significance of the performance, but still I managed to find out that it had some connection with the devil." That it is a ritual or religious dance we have no doubt. It is probable that this application of the word devil is derived from the colonists. It is a common practice among christians to regard heathen gods as devils. The Spanish conquerors declared that the American races worshipped the devil, but we now know these races had as good a lot of gods as ever ancient Greek or Roman prayed to. The distinction between a deity and a demon is often but a matter of individual judgment. The gods of the highest race have been vindictive and cruel. On the whole, from the perusal of this book, we are led to the opinion that the natives of Queensland have a cultus well worthy of earnest study.

On page 284 Mr. Lumholtz declares that sacrifices are not to be found in Australia. On page 136 he relates that, after certain cere-

monies performed over a boy, "the strips of skin which gradually fall off from the wounds as they heal are gathered in a little basket, which he subsequently carries for some time about his neck until he finally throws its content out in the woods—gives it to the 'devil,' as it is called. We are inclined to regard this as an instance of a sacrifice, but here there may be between author and reviewer a difference of definition rather than one of opinion.

We derive from Mr. Lumholtz' work a higher estimate of the autochthones of Queensland than we entertained before we read it. We find that they have a sign language; that they use the message sticks observed in other parts of Australia; that they have laws respecting property, binding though unwritten, (p. 147); that they have stated occasions when the injured may right their wrongs, which, if inferior in development to modern courts of justice, are fully equal to the mediæval passages at arms. We discover that wives are often treated with respect and even with fondness, that women have influence, and that their voice is not without its weight in tribal councils.

In describing a *Korrobee*, he says, (p. 239): "On one side of the square opposite the music, a sort of chamber was constructed where the chief performers made their toilets and kept themselves concealed until the performance commenced." Is not this merely the antipodal counter-part of the medicine-lodge of the American ceremonies? He speaks also of the presence of clowns at the dance; similar characters are commonly seen at Indian rites. The picture of the sepulchral scaffold, on p. 275, might be used to illustrate a book of travel in Dakota 20 years ago. But the parallels between Australian and American ethnography might fill a volume.

The work is readable. No one who peruses the first chapter will lay the book aside until he has finished it. The author satisfies our curiosity on many points, but he arouses it and leaves it still craving on many more. We wish he had witnessed a cannibal feast and could tell us thereof as much from personal observation as he has told us of the snake-feast. We think we could have condoned his offence even had he joined the natives in a hunt for *tálogro*; but we must not expect everything. He has accomplished wonders in four years' travel, occupied as he was with other interests, yet we close the book with the conviction that there is much more to be told. We feel that the lore of the savages of Australia is like the gold of

her mountains, though far more precious, and that much more remains behind than has ever been taken away.

We hope that Mr. Lumholtz' work among the Australians is not ended, and that he may be afforded further opportunities of pursuing his investigations. He is peculiarily fitted for an explorer. He possesses youth, strength, a good digestion, a "strong stomach," a resolute purpose, a Norseman's valor, an enthusiastic love for his work, and, above all, a clear understanding of the peculiar difficulties which beset the path of the ethnographer. Who that has ever wrestled in spirit with the wily savage to win from him the secrets of his heart will not agree with the opinions expressed in the first paragraph on page 228, which he closes by saying: "The best information is secured by paying attention to their own conversations. If you ask them questions they simply try to guess what answers you would like and then they give such responses as they think will please you. This is the reason why so many have been deceived by the savages, and this is the source of all the absurd stories about the Australian blacks."

W. MATTHEWS.

La France Préhistorique d'après Les Sépultures et les Monuments par Émile Cartailhac, Paris, 1889.

The director of the well-known review, *Matériaux pour l'Histoire primitive de l'Homme*, gives the result of many years of labor in this volume of 336 octavo pages with 162 illustrations in the text. While its title restricts its scope to the territory of France and its line of prehistoric researches to sepulchral and monumental remains, those are introduced by a general discussion on the antiquity of man and the primitive stages of his culture. Also throughout the volume comparisons and parallels taken from all parts of the world are presented in illustration and explanation of the topics under immediate examination. The author announces that the present monograph, devoted exclusively to the age of stone, will be followed by one upon the early part of the metallic age.

The most marked characteristic of the work is that it is not confined to a statement of facts more or less definitely ascertained, as is the usual course in treatises intended for simple tuition, but that it

directs at least equal attention to the still uncertain problems upon which the continued efforts of intelligent students may profitably be engaged. The author emphatically professes as his guiding principle that all theories, of whatever apparent value, should retain only a provisional character. He declares that the essential mode of reaching the truth is to make avowal of ignorance, and that the definition of the boundaries of the unknown is the first step in the promotion of discovery. This cautious and philosophic attitude is in marked contrast to the haste and dogmatism which have been shown in some other treatises on prehistoric man. It is illustrated in his judicious, and indeed judicial, discussion of the two so-called Canstadt and Cro-Magnon races, which he concludes by a note of warning on the impossibility of forming valid reasoning from the small number of crania available for study. Granting the races as once distinct, their marches and counter-marches in migrations would necessarily have involved the frequent marriage of the male invaders with the women of the invaded people, and hence hybridization. Intricate mathematical devices for the study of prehistoric man have been unproductive in result. Paleontologists have not found such devices to be necessary in the classification of fossil animals. In every recent year new instruments of precision have been invented for the comparative mensuration of all the bones of man, and cranial measurement has been refined to such an extent as to require eighty groups of figures for its record, yet all with dubious advantage.

Perhaps the most positive, and at the same time the most useful general remarks made by the author on a controverted theme, are on the length of the neolithic age. These remarks suggest the mobility of peoples and their propagation by dispersal as distinct from their migrations in bodies, during the neolithic age. The gradual results of immigration and emigration and of intertribal connection would account for much of what has been attributed, in a loose and grandiose style, to cataclysmic irruptions and convulsions. The causes of change in population which are now in operation were, with proper allowance for differing conditions, in operation in prehistoric times. But, as the author infers, such views require the admission that the neolithic period was of much longer duration than has generally been granted to it in the anthropologic chronology.

This excellent work will be more appreciated by the general student than by specialists, for the reason that specialists are not often philosophic.

GARRICK MALLERY.

Pawnee Hero Stories and Folk-Tales with Notes on the Origin, Customs, and Character of the Pawnee People, by George Bird Grinnell. New York Forest and Stream Publishing Company, 1889.

It has long been known that our Indians possessed a rich store of hero tales and mythology, and that by the narration of these their winter camp-fires were enlivened, the brave deeds done by their warriors were handed down, and the mythical explanation of things were perpetuated from generation to generation. A vast number of these stories have been gathered from time to time by travelers and by students. As repeated by the former the tales are but too often the skeletons of the full narrations, while the literal translations of the professed student, though of great value to the linguist, are by no means so well adapted to the wants of the ordinary reader.

The present volume, therefore, will be welcome to a large class, both because the author's long and intimate acquaintance with the Pawnees enables him to speak whereof he knows, while his literary skill enables him to present his subject in a most attractive style. The author has seized the opportunity to preserve these stories none too soon, for the tribe has wofully diminished of late years. When he knew them on the Loup Fork, in Nebraska, in 1870, they numbered 3,000, while now they number but about 800. The knowledge of the old traditions and of the myths disappear almost as rapidly, and to delay their collection means to lose much of the aboriginal flavor. White influence has already had a marked effect upon many of the customs and beliefs, as appears by the author's statement of Pawnee faith in one supreme deity, a belief which, in the case of no tribe, antedated contact with the European.

The folk-tales selected are of peculiar interest, and some of them doubtless date back to a remote period, though from the nature of their character such stories alter somewhat with each generation. Being in their essential character Indian philosophy—*i. e.*, an attempt to explain the nature and causes of phenomena, they in-

sensibly change with the growth of the people and embody new thoughts as knowledge and experience widen. Thus, though traditional, they are to be regarded as only to a slight extent historical, a truth which applies to hero-tale and myth alike.

The Pawnees are fortunate in having a historian so friendly and patriotic as Mr. Grinnell. No battle-scarred warrior to the manor born could exhibit more enthusiasm for Pawnee prowess in war and generosity in peace, or be more ready to detect and praise Pawnee virtues of all kinds than he. Other writers, with a like personal intimacy with other tribes, have shown the same partiality for them and, it may be added, the same poor opinion of alien and hostile tribes. There is scarcely a tribe prominently known in history which has not thus been exalted at the expense of other tribes—proof that virtues dwell in all alike, ready to spring forth at the touch of friendly intercourse. The Indian makes a capital friend and a dreaded enemy.

The author's "Notes on the Pawnees" occupy 193 of the 417 pages of the volume and contain some extremely interesting and valuable matter. His story of "A Summer Hunt" is a most graphic picture of the old time buffalo hunt, now a memory of the past, and nothing so good in its line has appeared since Parkman gave us his "California and Oregon Trail."

Under the head of "Relationships" the author enumerates the Pawnee divisions and the cognate tribes, but in his ethnologic details he is less happy that in other portions of the volume. It may be stated with confidence that, contrary to the author's conclusions, the Tonkaways and Lipans are not related to the Pawnees nor to each other. The Lipan and Tonkaway have been long associated and are extensively intermarried, and thus doubtless has arisen a confused idea as to their respective languages. The Tonkaway are, in fact, not known to be related to any other tribe, but stand apart and constitute a distinct linguistic family. If the Tonkaway personal names are similar to the Pawnee, the fact is curious and worthy of investigation, though it is by no means unknown for personal names to be borrowed from another tribe. The possession of similar songs may be explained by their purchase, a common Indian practice, or they too may have been borrowed, not perhaps directly from the Pawnee, but from some related tribe. Prior to the Civil War the Tonkaway were placed upon a reservation in Indian Territory,

where they were associated with Witchitas, Towakenoes, Caddos, Kichai, and Waco, all Pawnian tribes, and thus opportunity was afforded for unlimited borrowing.

The relationship of the Lipan to the Pawnee has been affirmed before, as Dunbar noted (p. 219), and for a very curious reason. An old spelling of the name is Lee-panes. The first syllable *Lee-* has been erroneously assumed to be the French particle *Le*, and so translated, The *Panes* or *Pawnees*. In point of fact the Lipan are a branch of the Apaches and speak an Apache dialect, which in turn belongs to the great Athapaskan or Tinné family of languages of British America. If, as the author probably correctly states, the Pawnees and their congeners originally came from the south, the Apache and Lipan, with the same or greater certainty, originated in the far north, and the only bond of kinship between the two peoples is that common to all Indian tribes wherever found.

The value of the book does not depend upon such details as these and should not be judged by them. Altogether the volume may be commended both to the student and the general reader as one of the very best of its class. Scattered through it are cuts of characteristic Pawnee faces, costumes, and implements, which add to its attractive appearance and are in keeping with the generally excellent make-up of the book.

H. W. HENSHAW.

Bibliography of the Muskhogean Languages by James Constantine Pilling. Washington: Government Printing Office. 1889. (Bulletin of the U. S. Bureau of Ethnology.)

The interest in American linguistics here and abroad is evidently increasing, and the number of scholars in the country at present engaged in the study of Indian languages, though even now not large, is a constantly growing one; ere long the subject will receive the attention it deserves. It is to be remarked, however, that as the number of students increase opportunities to collect material are diminishing, and with ever increasing rapidity. As the Indians die out, opportunities for original investigation die with them, and thus it appears that the duty of the hour for linguistic students is to accumulate and preserve the vanishing material rather than to elaborately study it. While the labors of Mr. Pilling concern the discovery and record of the linguistic material already gathered, they

have a distinct and important value, since they not only record the titles of books and tell where they may be consulted, but they furnish a comparative view of what has been done and of what remains to do to perfect the material for study in each group of languages. The fourth instalment of Mr. Pilling's work is now at hand in the "Bibliography of the Muskhogean Languages." The author's original plan contemplated a large volume, to include the whole subject of Indian bibliography, and in fact proof-sheets of this were printed and distributed among a small number of students. The present method of a separate bibliography for each linguistic stock is a great improvement, for as the studies of each student are generally confined to the languages and dialects of one family, the present plan brings within handy compass just the material needed by each one, and no more. Though based upon the material accumulated under the earlier plan of a single volume, the present Muskhogean bibliography is much more full than its predecessor, as it embodies the results of the compiler's later extensive researches, both at home and abroad, in public and private libraries. All the entries are under one alphabetic arrangement, a plan at once so simple and convenient that no one can fail to find what he is in search of or to learn just what material is available for study. To the latter end the plan adopted of cross-reference from the tribes to the matter published in the particular dialect, and to the authors, is an admirable one.

The fifth instalment is to be the Algonquian family—the most fruitful in material of all—and this is already far advanced toward completion. Altogether, linguistic scholars are greatly indebted to Mr. Pilling for the energy and thoroughness with which he has prosecuted his researches and for the admirable way in which they are presented, and to the Bureau of Ethnology under whose auspices the work has been prosecuted.

F. A. Seely.

The Legends and Myths of Hawaii—The Fables and Folk-Lore of a Strange People. By His Hawaiian Majesty Kalakaua. Edited and with an Introduction by Hon. R. M. Daggett. New York: Charles L. Webster & Co., 1888. 8vo, pp. 530, with map, pll., and ill.

Among the numerous works on folk-lore which have recently appeared, the present book is far from being the least important. Its interest consists in the fact that it contains the legends of one of a series of groups of isolated peoples extending over a vast area, though connected by linguistic and ethnic affinities, and in the additional fact that these mythical and semi-historical tales have been compiled and arranged by the ruler of the people among whom they are preserved. Though Kalakaua is known to be a writer of good English, and is probably fully competent for the production of these tales, no doubt the volume has benefited by the collaboration of Mr. Daggett, who in addition to his editorship supplies a valuable introduction of 65 pages.

In theorizing as to the origin of the Hawaiians, Mr. Daggett discards the current idea that they are of Malayan origin and adopts the view of the late Judge Fornander, who believed the Polynesian and Malayan races to be distinct, and traces the Hawaiian people to an Aryan origin in Asia. Mr. Daggett sees proofs of such an origin in the old Hawaiian religion, which he states has a "theocracy of curious structure," "a system of idolatrous forms and sacrifices engrafted without consistency upon the Jewish story of the creation, the fall of man, the revolt of Lucifer, the Deluge, and the repopulation of the earth."

In answering the question, "How did the Hawaiian priesthood become possessed of the story of the Hebrew genesis?" Mr. Daggett discards the idea that the story was acquired through Israelitish contact with the ancestors of the Polynesians, and offers as more reasonable the assumption that the "Hawaiian theogony, so strangely perpetuated, is an independent and perhaps original version of a series of creation legends common in the remote past to the Cushite, Semite, and Aryan tribes," and he might have added to most other peoples of the earth. If such criteria are to be relied upon as proof of origin and genetic relationship, then truly the whole world is akin. The mythology and customs of the North American Indians offer a great many parallels to Israelitish and other ancient beliefs

as striking as the Polynesian, and writers have not failed to use them to prove the descent of the Indians from Aryan or Semite ancestors.

According to recent anthropologic investigations it would appear that the groups of the Pacific, usually designated as the Polynesians, and the remaining insular peoples, termed the Papuans—one branch of which is represented by the Malagasy of Madagascar—are allied, although the former are distinguished by having wavy hair and light complexion, and the latter woolly hair and a dusky skin.

The Hawaiian Islands were made known to the world through their discovery by Capt. Cook in January, 1778, although it is stated that a manuscript chart, still in existence in the archives of the Spanish Government, goes to prove that these Islands had been discovered as early as 1555, by Juan Gaetano, on his trip from the coast of Mexico to the Spice Islands.

The first appearance of the Hawaiians in their present habitat was, according to tradition, about the middle of the sixth century, and at intervals other bands continued to arrive from the southern islands, presumably the Society group.

In the introduction is presented a list of sovereigns of Hawaii, giving the dates and duration of their reigns, commencing in 1095, and ending with the present ruler. The law of the *tabu* is explained as having been "a prerogative adhering exclusively to political and ecclesiastical rank. It was a command either to do or not to do, and the meaning of it was 'obey or die.'" The *puloulou*, or *tabu* mark, was placed upon or opposite anything not to be trespassed upon or to be entered—as the temples. The *tabu* color of royalty was yellow, while that of the priesthood was red, and feather mantles of these colors could be used only by kings and princes. A royal robe of this character is in the ethnologic collection of the National Museum in this city.

No reference is made either to the former practice of tattooing in Hawaii, or to the pictographic delineation of objects or ideas, although it is well known that petroglyphs occur quite frequently in some of the southern groups of islands, as well as the evidences of a past knowledge of some form of mnemonic characters.

In addition to an interesting account of the ancient religion, arts, habits and customs, illustrations are given of various utensils and weapons. Of the twenty-one legends presented those embraced between the first and the sixteenth, "The Destruction of the

Temples," relate to that period of Hawaiian history from the twelfth to the beginning of the present century. The remaining narratives are more purely mythical and relate chiefly to Hawaiian gods and goddesses.

The appendix consists of a glossary of over 450 words, with a brief note respecting the language, which, properly, contains but twelve characters, five vowels and seven consonants.

The character of the volume is such as to reflect great credit upon its author and to insure its welcome among folk-lore students.

W. J. HOFFMAN.

NOTES AND NEWS.

THE DESCENDANTS OF PALÆOLITHIC MAN IN AMERICA.—In an interesting article in the December number of the Popular Science Monthly, Dr. Abbot presents some important conclusions from recent studies from the Trenton district. He is convinced from long experience, that "in the vast majority of instances stone implements are practically in the same position that they were when buried, lost, or discarded."

In certain upland fields, never far from water courses, and in the alluvial mud of the tide-water meadows of the Delaware, he finds "well designed spear points, larger than Indian arrowheads, which might readily be supposed to be the handiwork of the historic Indians." Not more than 20 per cent. of these are found in other situations. With these he correlates a "rude pottery" found by Prof. Lockwood, in upland fields of the same locality. Referring such implements to palæolithic man, he concludes that he or his immediate descendants were not "strictly amphibious" but that they resorted to the forests and uplands for game.

The spear points are of argillite, as are the rude gravel implements which have been referred to the glacial epoch, and he concludes that the former indicate "no change of race, no abrupt transition from one method of tool-making to that of another, but merely an improvement that was doubtless as gradual as the change from the epoch of glacial cold to that of our moderate climate of to-day." He finds a marked preponderance of argillite implements on the crests of the uplands and a very great excess of jasper and

quartz on the bottom land, or that directly adjacent to the stream, and hence infers that when these higher points were occupied, the present streams maintained a uniform flow as high as the freshet stage of the present water courses. The fact that Indian village sites are nearer the water courses indicates that the "volume of water in all our streams, comparing century with century, is gradually lessening."

In solving the question of the race which made argillite implements, he seems inclined to dissent from the quoted conclusion of Prof. Haynes that, "the palæolithic man of the river gravels at Trenton and his argillite using posterity, the writer believes to be completely extinct," and believes that they who fashioned these rude argillite implements were the descendants of palæolithic man, and his superior in so far as a knowledge of the bow and arrow and rude pottery indicates."

This intermediate people he refers to the Eskimo. He does not consider that the Eskimo are necessarily the descendants of the more advanced palæolithic people, but that both were derived from palæolithic man.

The conclusion reached by Dr. Abbott, that the palæolithic man of the Trenton gravels did not remain absolutely stationary in respect to his arts, but improved his rude argillite implements to an extent which renders them comparable with Indian productions of a like nature, seems reasonable enough. To conclude also, that palæolithic man, habituated as he was to a cold climate and to the arts engendered thereby, followed the retreating ice-sheet northward, as doubtless did the animals and birds upon which he subsisted, and finally developed into the Eskimo, is not unreasonable.

The probability that some of the palæolithic men who dwelt at the edge of the ice-sheet when it occupied New Jersey, may have remained, and that "their descendants changed in their habits, so as to meet the requirements of a temperate climate," did not escape Dr. Abbott's attention.

Palæolithic man of New Jersey, habituated to a temperate climate—and the gradual recession of the ice-sheet with the consequent slow change of climate, fauna and flora gave ample time for such habitude—seems to possess all the requirements of the North American Indian. In fact, the Eskimo himself seems to be no other being, so far as we have evidence, than the Indian under the peculiar conditions of arctic climate. In some respects he is highly

specialized by the peculiar conditions of his life which merely means, I take it, that in order to live at all in the regions which he chose for his own, or was driven to, he brought himself into harmony with his surroundings, as have all other tribes and peoples wheresoever they live. But his language, arts, institutions, religion, methods of subsistence, and perhaps also his physical traits hardly differ more from many other stocks of Indians than such stocks do from each other.

The explanation of the origin of the many distinct families of Indians—and there are fifty-eight north of Mexico—will explain the origin of the Eskimo stock as well. There seems to be no present proof of a cataclysm which divides palæolithic man in this country from his successor, the North American Indian, and until such proof is forthcoming, it is more rational to consider palæolithic man as he who first left traces of his presence in this country and bequeathed his rude arts in unbroken succession to descendants who lived on and were found by Columbus in full possession of the land.

Mound Exploration in Georgia.—The results of a recent investigation of a Georgia mound by Mr. Reynolds, of the Bureau of Ethnology, are among the most remarkable yet recorded. This mound was discovered in a bend of the Savannah river, three miles from Hollywood and about the same distance from Silver Bluff, one of the supposed sites of the ancient town of Cutifachiqui. It proved to be a burial mound of the stratified type—the sub-stratum being a hard vegetable or "crawfish" soil, seven feet in depth, and the upper a sandy micaceous loam. The subsoil alone contained the interments.

Human Crania.—Only the merest traces of crania and teeth remained. The conditions were very conducive to decay.

Pottery.—The pottery consists of twenty-three clay pots, ranging in size from small narrow neck jars to huge urns or cooking vessels containg about sixteen gallons. Two of the latter class, elaborately ornamented by means of a stamping and combing process, respectively, are considered the largest specimens of aboriginal pottery yet discovered. One of the smaller specimens, which doubtless bears some religious significance and which from its character has been

denominated "the triune pot," consists of a vase, the neck of which unites three uniform human heads that form its base. Another, which might also have served some mythological function is elaborately and ingeniously carved, the carving being that of two symbolical rattlesnakes, their heads surmounted by horns, and their teeth, fangs, and rattles faithfully and skillfully executed. In one portion where the winding outline of the two serpents affords the space a human face is delineated in a somewhat grotesque manner. The tempering material of the pottery consists of a micaceous sand.

Copper Implements.—These were four celts of hammered, laminated copper, with more or less flaring edges. They were evidently objects more of treasure than of utility, for they had been wrapped in cloth and encased in bark, as was indicated by the remains of these perishable materials preserved by contact with the carbonate of copper.

Copper Ornaments.—These were plates of thin copper, with aboriginal figures worked in relief and similar in type to the repoussé specimens found in the celebrated mound at Etowah. Owing to the thinness of the copper and the great degree of oxidation that had occurred these specimens were found broken and so brittle that it was with difficulty they could be handled. These evidently were also objects highly prized by their owners, since they had been enveloped first in some kind of leather, which in turn was wrapped in a fine rush matting, and the whole encased in bark.

Several copper-sheathed wooden bosses were also found, similar in type to those described by Dr. Joseph Jones from a mound in Tennessee.

Galenite.—Four lumps of crude galenite, each about the size of a hen's egg, were interred with the above specimens of copper.

Textile Fabrics.—The traces of textile fabrics that appear with the copper specimens and preserved by contact with the copper carbonate, are of the primitive aboriginal type. The cloth is of the twined combination described by Mr. Holmes under group No. 2, in his work on Prehistoric Textile Fabrics. The fibre is vegetable, most probably of mulberry bark or cane. The rush matting is of the simple interlacing type, but the texture is of a finer quality than any hitherto found.

Pipes.—There were also found eleven pipes ingeniously carved, some from stone others from clay. All present a distinct type. One represents the head and body of an owl; another, carved from

soapstone, the figure of a sitting man with legs crossed and heels against the buttocks. The bowl of the pipe is in his lap and held between his hands. Hands, features, and head-dress are most skillfully delineated and the whole indicates a marked advance in the sculptor's art.

Stone Implements.—Many stone implements, such as flint spear-heads, celts, chisels, sharpening, and discoidal stones were found. Probably the most perfect and remarkable specimen of its kind is an extremely symmetrical bi-concave disk of marble, having a small uniform pit or depression in the center of each concavity.

Beads.—Perforated beads of pearl and shell were found in close proximity to the remains of human teeth. The shell beads were quite plentiful, and were of three types—some being prototypes of the beads discovered in the great mound at Etowah.

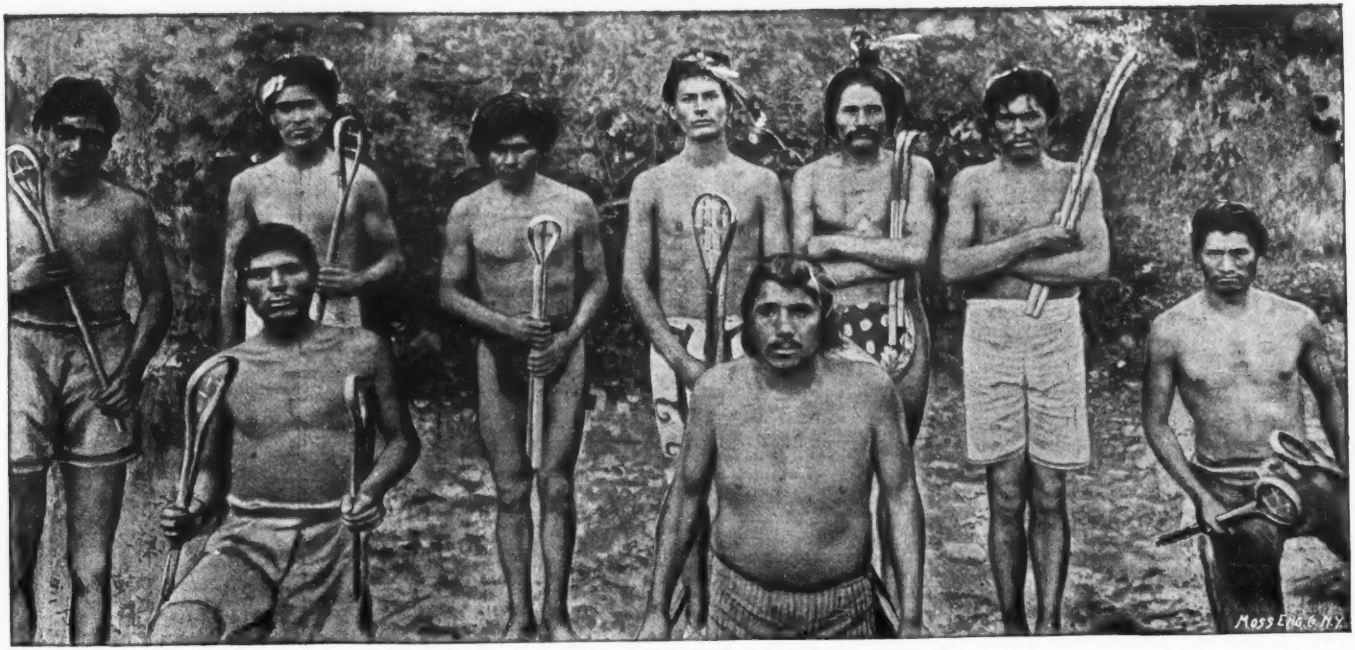
These burials were all deposited upon a thin layer of sand upon two general levels within the lower division of the mound. Upon each level they lay in a circle just beneath hearths or fire-beds which appear to indicate the subsequent performance of some ceremony with fire over the spot where the burials had been made. None of the interments can be considered intrusive since the homogeneity of the lower soil in which they lay was undisturbed.

Mr. Reynolds' report describing in full the features and contents of this mound, will be duly published, with illustrations, in one of the Bulletins of the Bureau of Ethnology.

H. W. HENSHAW.

Os INCÆ.—In a series of eighty-two skulls belonging to the Canadian Institute, coming from various parts of the province of Ontario, probably mostly Algonkins, I find that the *Os Incæ* is perfectly developed in only one skull; or in 1.22 per cent. (in exact figures, 1.2195). I have not completed a careful examination for the *Os quadratum* and allied varieties.

A. F. CHAMBERLAIN.



WOLFTOWN BALL TEAM, OCTOBER, 1888.